SAMSUNG

SYSTEM AIR CONDITIONER

GH052EAM
GH070EAM

TRAINING Manual

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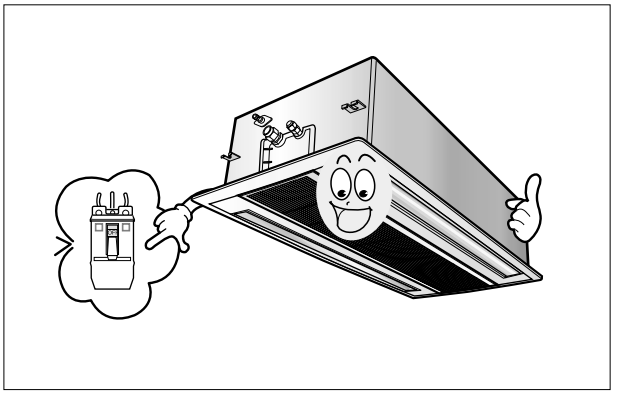
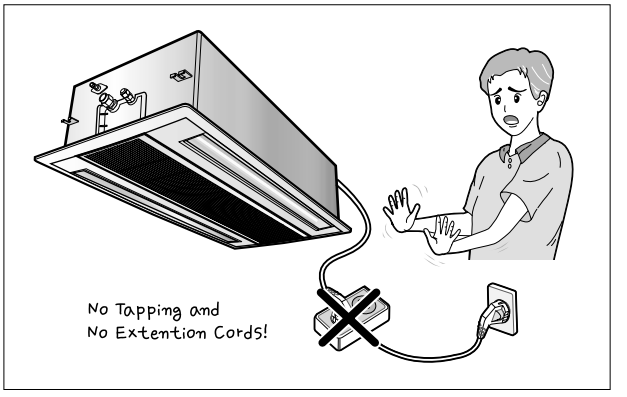
1. Precautions

1) Cut off the power.
- Make sure to cut off the power before repair. If not, you may be damaged by an electric shock.



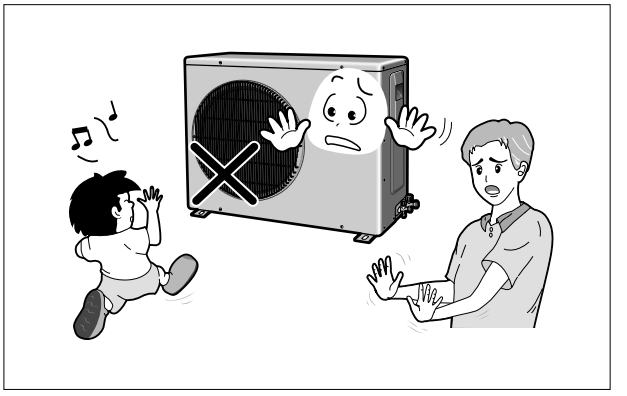
2) Do not install an outdoor unit on the apartment outside wall(or equivalent) for safety.
- Installing an outdoor unit on the apartment outside wall(or equivalent) is prohibited for the safety purpose. Service will not be available for the outdoor unit where our servicemen can not access and the cost of moving the outdoor unit to the service area will be borne by the customer.
- If requested by the customer, you shall discourage him to install an outdoor unit on the apartment outside wall(or equivalent).

3) Keep the drain hose outlet free.
- Otherwise, air flow will get slow, which may hinder cooling capacity.
- Also, dew may be laden on the service valve.



4) Use of Certified Parts
- Use certified parts only. (An electric contact part, if broken down, shall not be repaired but replaced with a new one. Remodeling shall be prohibited. In no case, the customer shall repair the product on his own because this is dangerous enough to bring about breakdown or fire.)

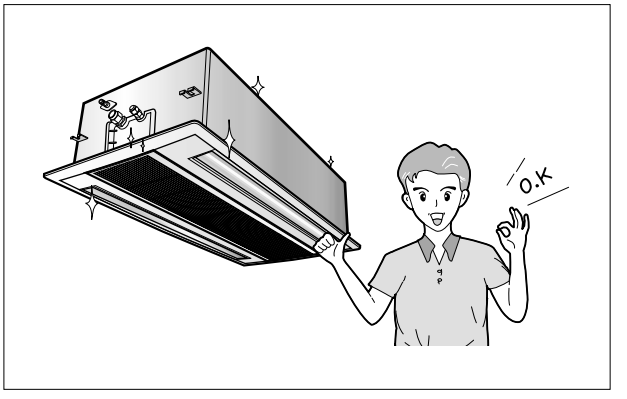
5) Ban on Middle Connection of Power Cord
- Do not cut the power cord in the middle to be connected to other power cord nor use a middle socket between two power cords. This is dangerous enough to bring about breakdown or fire.



6) Check Insulation
- After assembly, be sure to check insulation resistance. (Use an insulation ohmmeter to measure the insulation resistance between the power cord and the earthing wire. Do not supply power until it reads 30MΩ.)

7) Be sure to keep the symmetry of the product.
- Otherwise, you may hear vibration noise.

8) Caution for Children
- Keep children off the product while it is in repair. Otherwise, they might be endangered.



9) Be sure to put the indoor or outdoor unit free of corrosive gases such as sulfuric water, ammonium and sulfuric gas.
- Otherwise, copper tubes or soldered parts could be corroded causing refrigerant leak.

10) Arrangement of surroundings
- After repair finishes, clean the air conditioner and its surroundings and inform the customer of what it is like.

2. Product Specifications

2-1 Table

MODEL		INDOOR UNIT		GH052EAM	GH070EAM
		OUTDOOR UNIT		UH052EAMT	UH070EAMT
		PANEL		PG103M, PG103M1, PG103M2	
Capacity		Cooling	BTU/hr	18,700	23,900
			Watts	5,500	7,000
		Heating	BTU/hr	20,400	26,300
			Watts	6,000	7,700
Power Supply				1ø, 220~240V~, 50Hz	1ø, 220~240V~, 50Hz
Indoor Unit	Power Input	Cooling	Watts	1,750	2,350
		Heating	Watts	1,800	2,500
	Running Current	Cooling	A	7.7	10.5
		Heating	A	8.0	11.0
	Fan Speed	U-High	r.p.m	-	-
		High	r.p.m	1,315	1,350
		Mid	r.p.m	1,210	1,245
		Low	r.p.m	1,105	1,140
	Air Circulation	High	m^3/ min	14	14
		Mid	m^3/ min	12	12
		Low	m^3/ min	10	10.5
	Noise Level (Sound Pressure)	High	dB(A)	45	46
		Mid	dB(A)	44	45
		Low	dB(A)	43	44
	Heat Exchanger	Type		Slit-fin coil	Slit-fin coil
		Row x Stages x Fin Pitch		2 x 10 x 1.3(580mm)	3 x 10 x 1.5(580mm)
	Fan	Type		Cross Flow Fan	Cross Flow Fan
		Motor Output	W	28	28
	Dimension (Net / Gross)	H	mm	230 / 299	230 / 299
		W	mm	890 / 1,077	890 / 1,077
		D	mm	575 / 642	575 / 642
	Weight	Net / Gross	kg	21 / 25	22 / 26
Outdoor Unit	Fan Speed	High	r.p.m	750	850
		Low	r.p.m	400	340
	Sound Pressure Level		dB(A)	61	61
	Fan	Type		Propeller Fan	Propeller Fan
		Motor Output	W	60	73
	Compressor	Type		Rotary	Rotary
		Model		NN21VBAMT	NN29VACMT
		Motor Output	kW	1.3	1.9
		Protection		Internal	Internal
	Heat Exchanger	Type		Slit-fin coil	Slit-fin coil
		Row x Stages x Fin Pitch		2 x 28 x 1.5	2 x 28 x 1.5
	Refrigerant	Control		EEV	EEV
		Type		R410A	R410A
		Charge	g	1,550	1,650

Table(cont.)

MODEL		INDOOR UNIT		GH052EAM	GH070EAM
		OUTDOOR UNIT		UH052EAMT	UH070EAMT
		PANEL		PG103M, PG103M1, PG103M2	
Outdoor Unit	Dimension (Net / Gross)	H	mm	648 / 749	648 / 749
		W	mm	880 / 1,079	880 / 1,079
		D	mm	310 / 418	310 / 418
	Weight	Net / Gross	kg	67 / 72	69 / 74
Condition	Indoor Unit	Cool(DB/WB)	˚C	27 / 19	27 / 19
		Heat(DB/WB)	˚C	20 / 15	20 / 15
	Outdoor Unit	Cool(DB/WB)	˚C	35 / 24	35 / 24
		Heat(DB/WB)	˚C	7 / 6	7 / 6
Piping	Pipe O.D. Size	Liquid	mm(inch)	6.35(1/4")	6.35(1/4")
		Gas	mm(inch)	12.7(1/2")	15.88(5/8")
	Connection Method			Flare	Flare
	Between	Height	m	Max. 15	Max. 15
		Pipe Length	m	Max. 30	Max. 30
Panel	Dimension (Net / Gross)	H	mm	70 / 151	
		W	mm	1,030 / 1,103	
		D	mm	650 / 727	
	Weight	Net / Gross	kg	4 / 8	

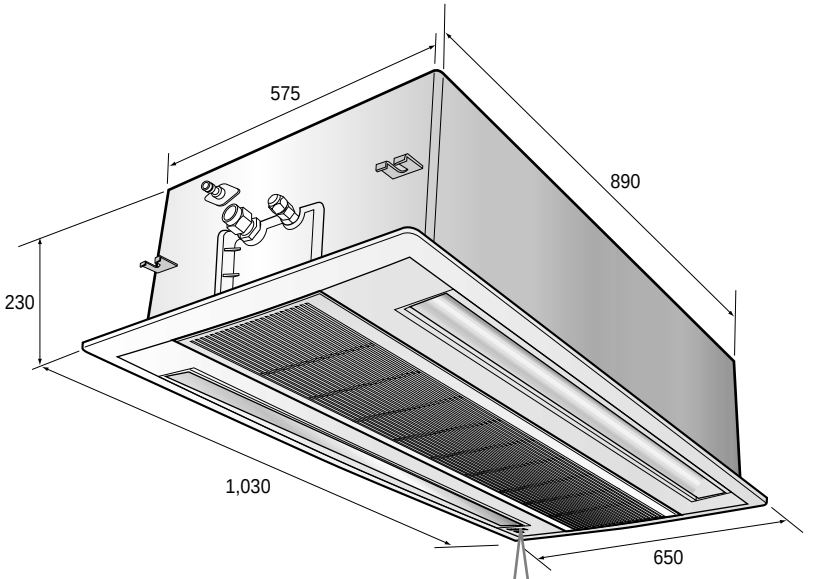
Notice : Air Flow rate : Fan Step Control : Low → Mid → High

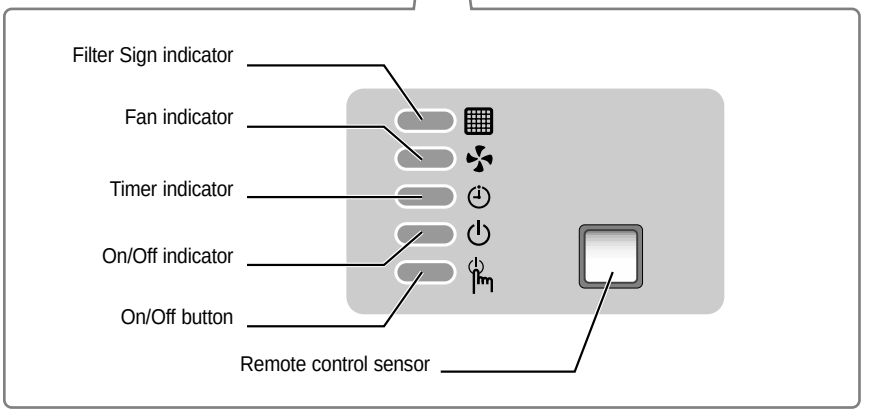
3. Operation Instruction & Installation

3-1 View of the Unit

3-1-1 Indoor Unit

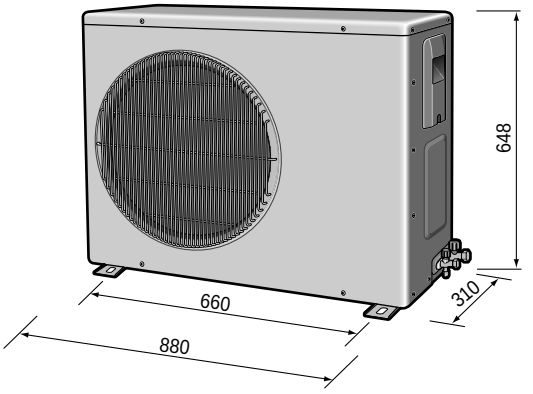
(Unit : mm)





3-1-2 Outdoor Unit

(Unit : mm)

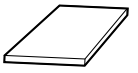
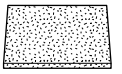
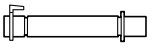
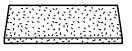


3-2 Air Conditioner and Accessories

The following accessories are supplied with the air conditioner.

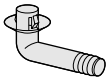
■ The quantities are indicated in parentheses.

3-2-1 Accessories in the Indoor Unit Case

Pattern sheet	Insulation refrigerant pipe 	Insulation cover drain 	Flexible hose 	Insulation drain	Installation manual
Rubber	Insulation cover band 				

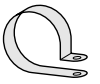
✻The following accessories are supplied with the indoor unit.
The type and quantity may differ depending on the specifications.

3-2-2 Accessories in the Outdoor Unit Case

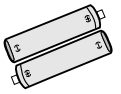
Drain Plug (1) 	Rubber LEG (4)	Nut(2)

3-2-3 Optional Accessories

■ **Wired Remote Controller Accessories**

Wired remote controller(1)	Cable-tie(2)	Cable clamp(6) 	M4x16 tapped screw(7)	Indoor unit power drawing cable(1)	Owner's instructions(1)
Installation manual(1)					

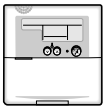
■ Wireless Remote Controller Accessories

Wireless remote controller(1)	Battery(2)	Remote control holder(1)	STS 2S-2x10 tapped screw(2)	Owner's instructions(1)	Installation manual(1)
					

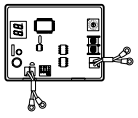
■ Centralized Controller Accessories

Centralized controller(1)	Cable-tie(2)	Cable clamp(5)	M4x16 tapped screw(7)	Owner's instructions(1)	Installation manual(1)

■ Function Controller Accessories

Function controller(1)	Cable-tie(2)	Cable clamp(6)	M4x16 tapped screw(7)	Owner's instructions(1)	Installation manual(1)
					

■ Transmitter Accessories

Transmitter(1)	Transmitter power cable(1)	Transmitter communication cable(1)	Installation manual(1)
			

3-3 Installation

3-3-1 Before Installation

Keep the air conditioner drain hose outlet and inlet free from its surroundings.
In case of breakdown, keep the symmetry and fix it to prevent vibration.
The pipe length shall meet the standard as far as possible.

3-3-2 Installation Procedure

■ Location

Install the product in an area to guarantee the best cooling effect, convenience of piping and electric work, and inexistence of vibration or wind in the vicinity.

■ Wall Drilling

Drill the wall downward in a diameter of 60 to 65mm.

■ Fixing Indoor Unit & Outdoor Unit

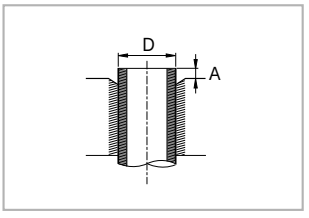
Fix the air conditioner hard enough so that it can not fall to the ground. On the roadside, the outdoor unit shall be installed 2m above ground and kept away from pedestrians to prevent direct exposure to hot wind.

■ Pipe Spooling & Connecting

You shall cut the pipe straightly with a pipe cutter and grind all the burrs of the cut surface.
Pipe expansion may continue until the pipe surface becomes uneven or torn apart.
Be sure to use a torque wrench to tighten pipes or flare nuts.

<Torque & Depth>

Outer Diameter(D)	Torque(kgf·cm)	Depth(A)
6.35mm(1/4")	140~170	1.3mm
9.52mm(3/8")	250~280	1.8mm
12.70mm(1/2")	380~420	2.0mm
15.88mm(5/8")	440~480	2.2mm
19.05mm(3/4")	990~1,210	2.2mm



■ Leak Test

Put an inert gas like nitrogen in the outdoor unit pipe and put soap bubbles or other test liquids on he pipe surface for the leak test.

■ Drain Hose Connecting

Install the drain hose downward to drain water naturally. Be sure to pour water into the hose to check if it drains well.

■ Electric & Earth Work

Electric and earth work shall meet the "Electric Facility Technology Standard" and the "Internal Wire Regulation" of the Electric Business Laws.

■ Inspection & Trial Run

Upon completion of the tests, you shall make a trial run while you explain the main functions of the air conditioner to finish the installation.

3-4 Installation Diagram of Indoor Unit and Outdoor Unit

3-4-1 Air-Purge Procedure

1) Connect each assembly pipe to the appropriate valve on the outdoor unit and tighten the flare nut.

2) Connect the charging hose of low pressure side of manifold gauge to the packed valve having a service port (3/8" Packed valve) as shown at the figure.

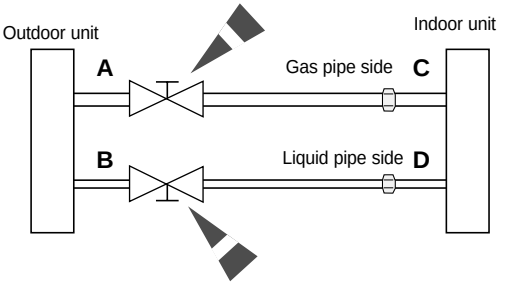
3) Open the valve of the low pressure side of manifold gauge counter-clockwise.

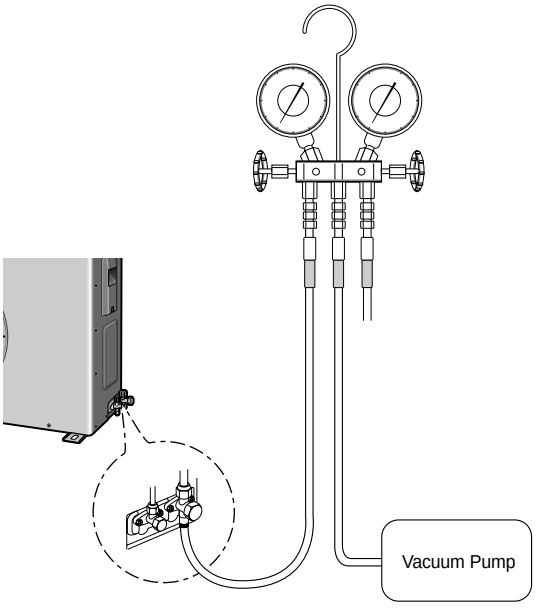
4) Purge the air from the system using vacuum pump for about 30 minutes.
   - After that, please recheck that pressure is stabilization.
   - Close the valve of the low pressure side of manifold gauge clockwise.
   - Remove the hose of the low pressure side of manifold gauge.

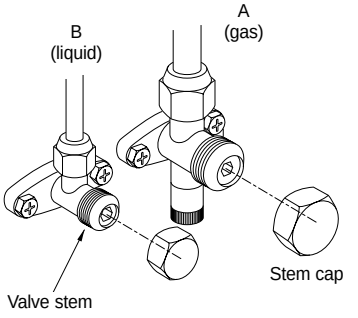
5) Set valve cork of both liquid side and gas side of packed valve to the open position.

6) Mount the valve stem nuts to the 2-Way and 3-Way valve. And mount the service port cap to 3-Way valve.

7) Check for gas leakage.
   - At this time, especially check for gas leakage from the 3-Way valve's stem nuts, and from the service port cap.







3-4-2 Refrigerant Refill

Refill an air conditioner with refrigerant when refrigerant has been leaked at installing or using.

1) Purge air(for new installation only).

2) Turn the 3-Way valve clockwise to close, connect the pressure gauge (low pressure side) to the service valve, and open the 3-Way valve again.

3) Connect the tank to refill with refrigerant.

4) Set the unit to cool operation mode.

5) Check the pressure indicated by the pressure gauge(low pressure side).

   *** Standard pressure is should be 14~16kg/cm² in a regular, high operation mode.**

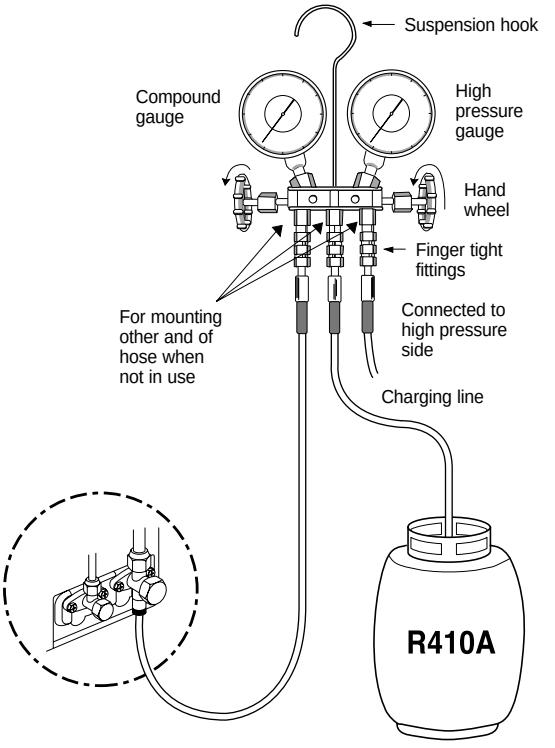
6) Open the refrigerant tank and fill with refrigerant until the rated pressure is reached.

   *** It is recommended not to pour the refrigerant in too quickly, but gradually while operating a pressure valve.**

7) Stop operation of the air conditioner.

8) Close the 3-Way valve, disconnect the pressure gauge, and open the 3-Way valve again.

9) Close the cap of each valve.



3-4-3 ”Pump down” Procedure

Pump down will be carried out when an evaporator is replaced or when the unit is relocated in another area.

1) Remove the caps from the 2-Way valve and the 3-Way valve.

2) Turn the 3-Way valve clockwise to close and connect a pressure gauge (low pressure side) to the service valve, and open the 3-Way valve again.

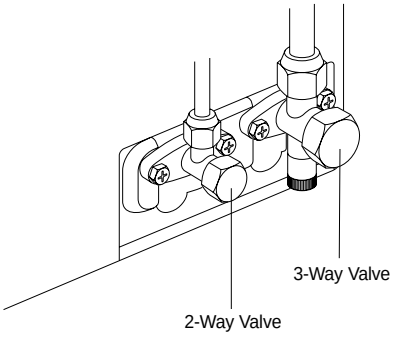
3) Set the unit to cool operation mode. (Check if the compressor is operating.)

4) Turn the 2-Way valve clockwise to close.

5) When the pressure gauge indicates "0" turn the 3-Way valve clockwise to close.

6) Stop operation of the air conditioner.

7) Close the cap of each valve.



Remarks

Relocation of the air conditioner

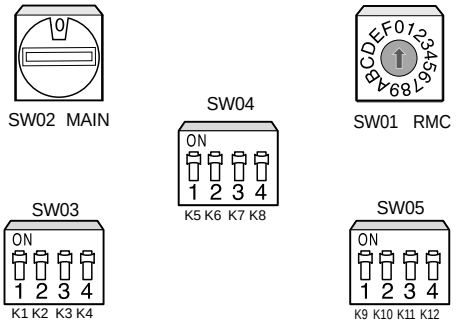
- Refer to this procedure when the unit is relocated.
- Carry out the pump down procedure (refer to the details of 'pump down').
- Remove the power cord.
- Disconnect the assembly cable from the indoor and outdoor units.
- Remove the flare nut connecting the indoor unit and the pipe.
- At this time, cover the pipe of the indoor unit and the other pipe using a cap or vinyl plug to avoid foreign material entering.
- Disconnect the pipe connected to the outdoor unit.
  At this time, cover the valve of the outdoor unit and the other pipe using a cap or vinyl plug to avoid foreign material entering.
- Make sure you do not bend the connection pipes in the middle and store together with the cables.
- Move the indoor and outdoor units to a new location.
- Remove the mounting plate for the indoor unit and move it to a new location.

3-5 Installation

3-5-1 Assigning Address to Indoor Unit

1. Before installing the indoor unit, assign an address to the indoor unit according to the air conditioning system plan.

2. The address of the indoor unit is assigned by adjusting MAIN(SW02) and RMC(SW01) rotary switches.



✻ Yon don't have to assign the MAIN address when installing an indoor unit for one outdoor unit.

3. The MAIN address is for communication between the indoor unit and the outdoor unit.
   Therefore, you must set it to operate the air conditioner properly.

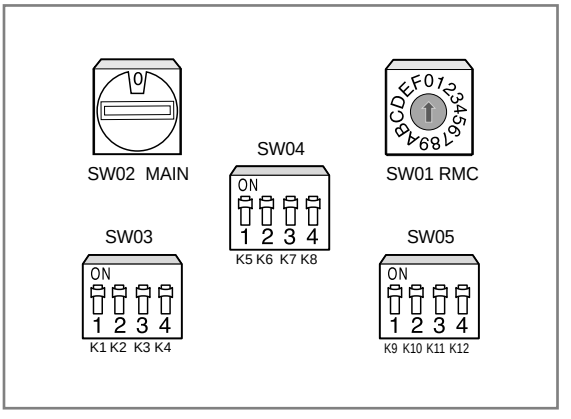
4. It is required to set the RMC address if you install the wired remote controller and/or the centralized controller.

5. If you install optional accessories such as the wired remote controller, centralized controller, etc. see an appropriate installation manual.

6. If an optional accessory is not installed, you do not have to set the RMC address. However, adjust K1 and K2 switches of the SW03 DIP switch to "ON" position in this case.

7. Set the MAIN address by adjusting the rotary switch(SW02) from 0 to F. Each indoor unit connected to the same outdoor unit must have different address.

   i. e. If an indoor unit does not have an optional accessory and its MAIN address is "0".

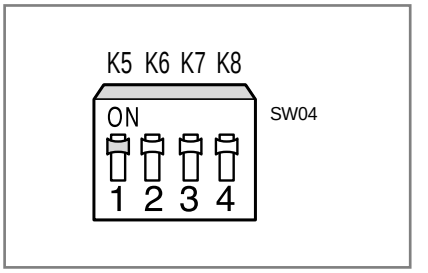


3-5-2 Additional Functions

■ Compensation for lost temp. in heating operation

• Reduces the difference between an actual room temp. and a sensed temp. by the air conditioner when heating.

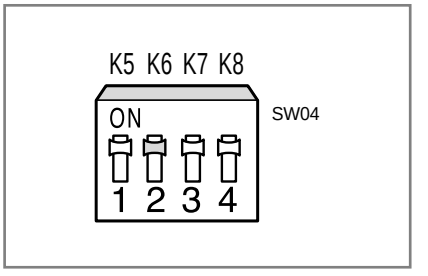
Switch No.	Switch ON	Switch OFF
K5	2°C compensation	5°C compensation



■ Adjusting filter cleaning cycle

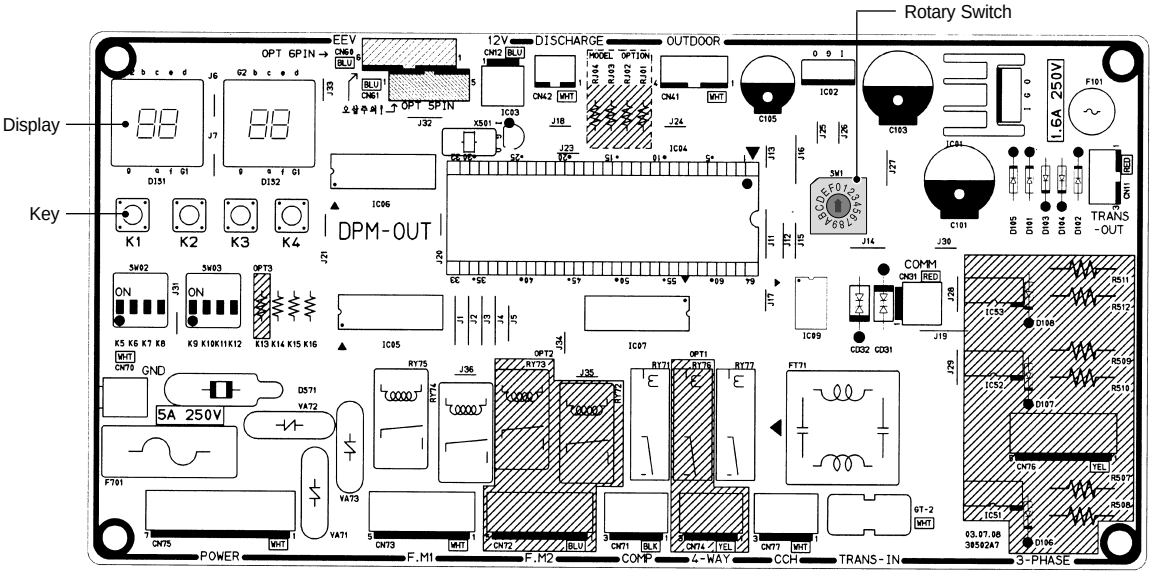
• You can adjust the cycle for filter sign indicator.

Switch No.	Switch ON	Switch OFF
K6	1000 hours	2000 hours



3-5-3 Setting Up Option Switches

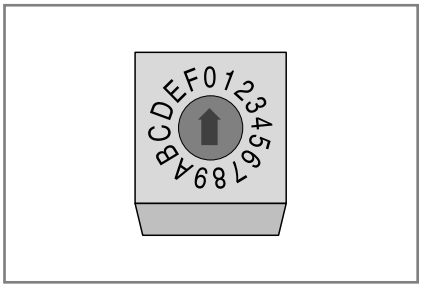
■ Option Switch



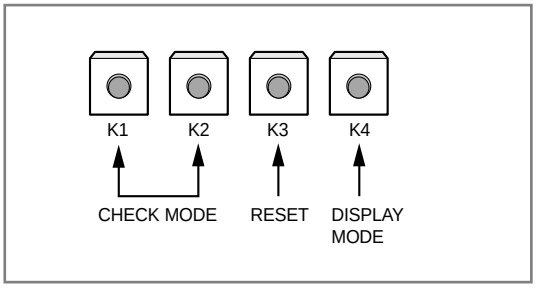
■ Rotary Switch

You should display that how many indoor units are connected to the outdoor unit. Refer to the table below, then turn the arrow to appropriate position.

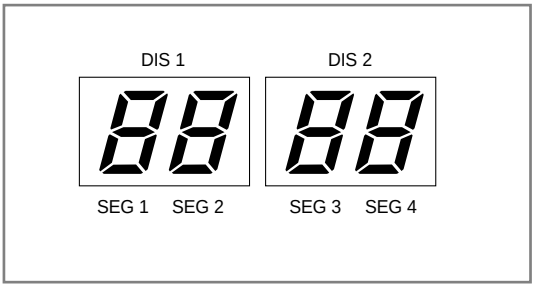
Switch No.	Number of indoor unit(s)	Switch No.	Number of indoor unit(s)
0 or 1	One	9	Nine
2	Two	A	Ten
3	Three	B	Eleven
4	Four	C	Twelve
5	Five	D	Thirteen
6	Six	E	Fourteen
7	Seven	F	Fifteen
8	Eight	-	-



■ KEY



■ Display



■ Summary of KEY functions

Function / Number of press times	K1 (Displayed on SEG 3, 4)	K2 (Displayed on SEG 3, 4)	K3 (Displayed on SEG 3, 4)	K4 (Displayed on SEG 3, 4)
1	Adding refrigerant at heating mode	Adding refrigerant at cooling mode	Reset	Displays data
2	Test operation at heating mode	Test operation at cooling mode	-	-
3	End	Pump Down for recovery of refrigerant	-	-
4	-	End	-	-

✻ Use the K1 only for heat pump models.

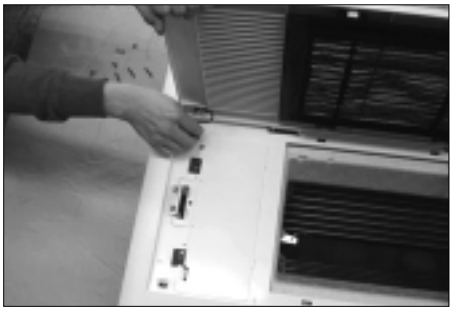
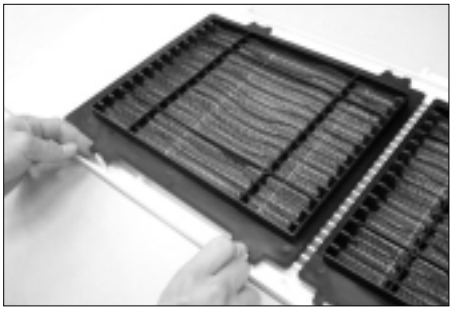
■ Reading data indicated on the display

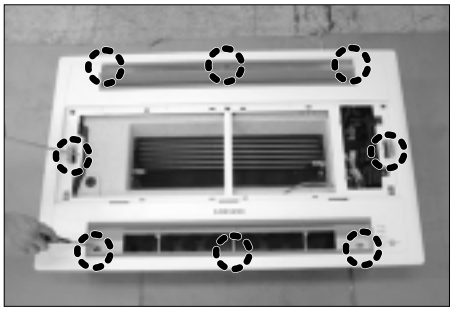
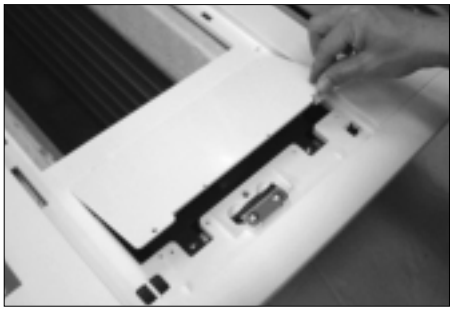
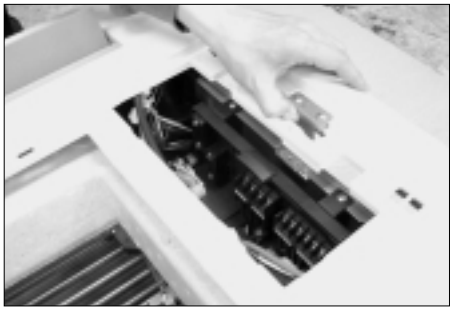
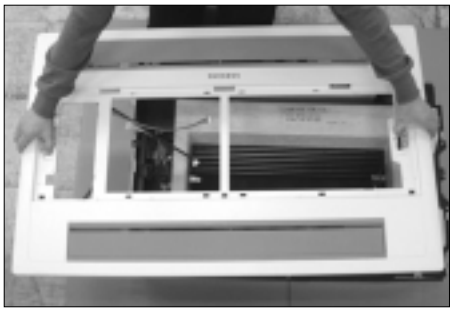
KEY	Number of press	Item	Example	
			Display	Meaning
K1	1	Adding refrigerant for heat pump models	H1	
	2	Test operation for heat pump models	H2	
	3	End		
K2	1	Adding refrigerant for cooling only models	H3	
	2	Test operation for cooling only models	H4	
	3	Pump Down for recovery of refrigerant	H5	
	4	End		
K3		Reset		
K4	1	Discharge temp. of compressor	3 110	110 °C
	2	Temp. of outdoor heat exchanger	4 38	38 °C
	3	Outdoor temp.	5 34	34 °C
	4	Step of electronic expansion valve (0 step : all closed, 480 step : all open)	6 12	120STEP (12 x 10)
	5	Temp. of evaporator	7 -2	-2 °C
			7 12	12 °C
	6	Indoor temp.	8 22	22 °C
	7	Stopping view mode & display communication data		

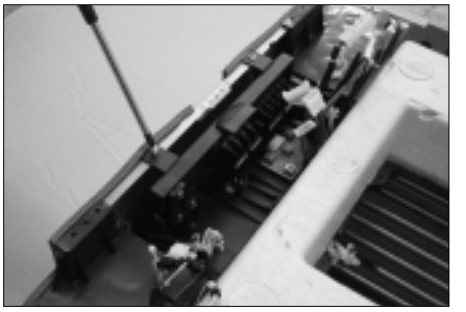
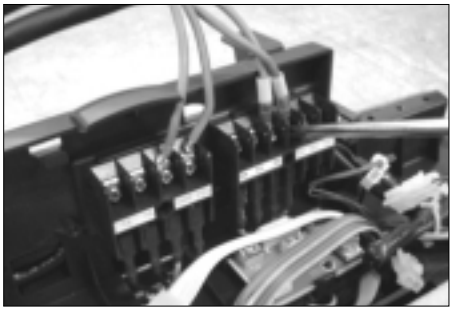
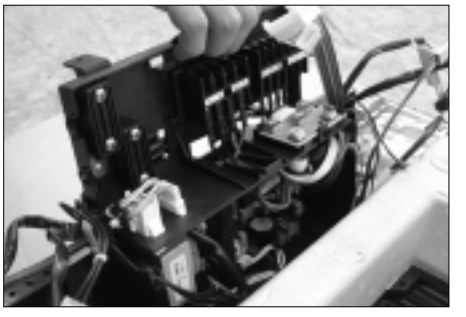
4. Disassembly and Reassembly

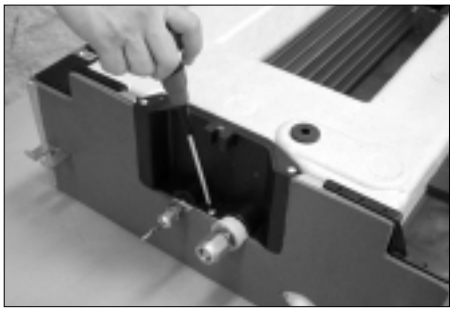
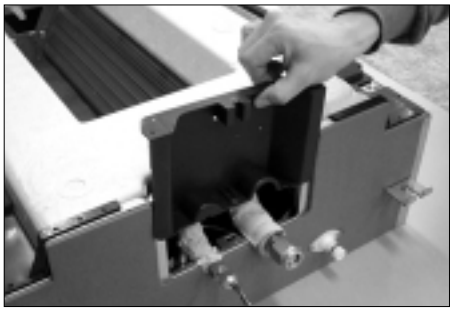
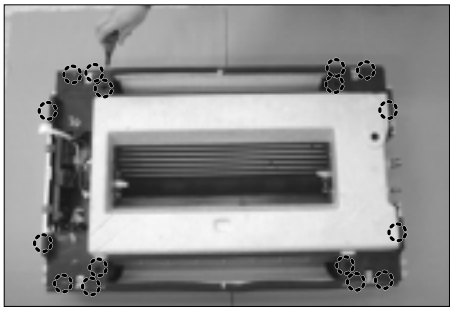
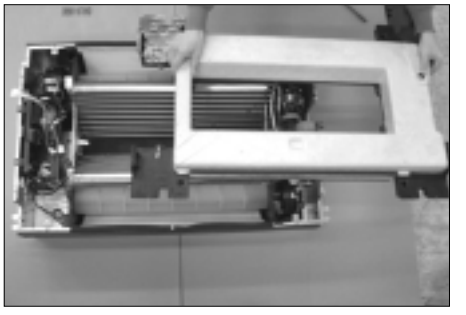
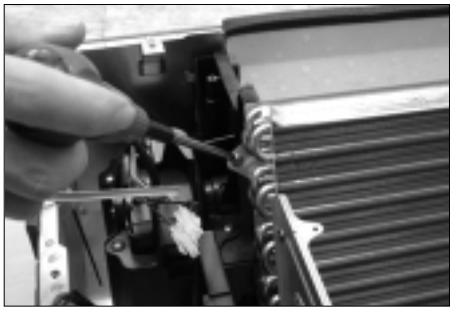
Stop operation of the air conditioner and remove the power cord before repairing the unit.

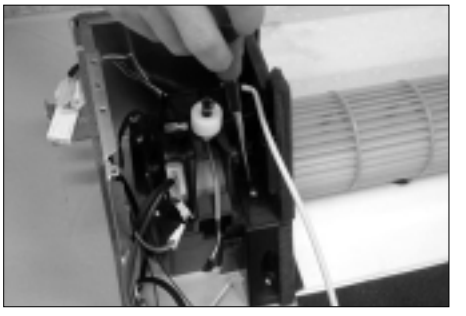
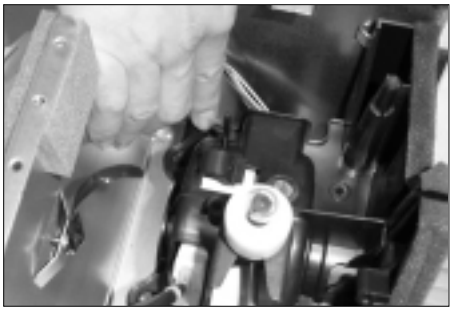
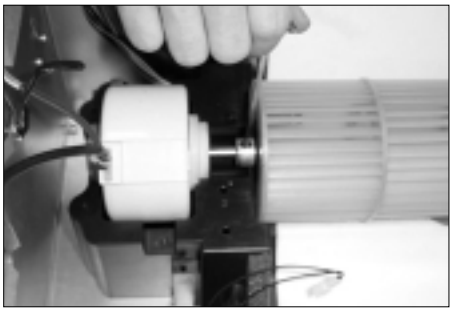
4-1 Indoor Unit

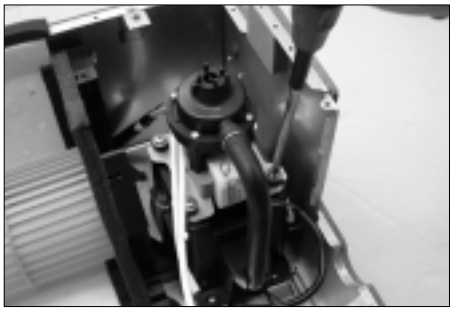
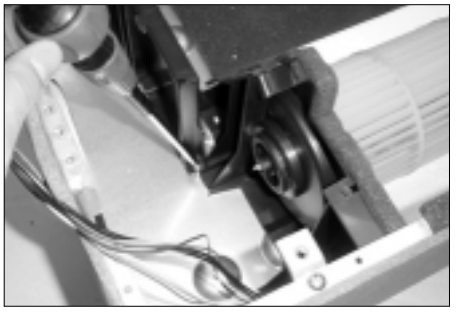
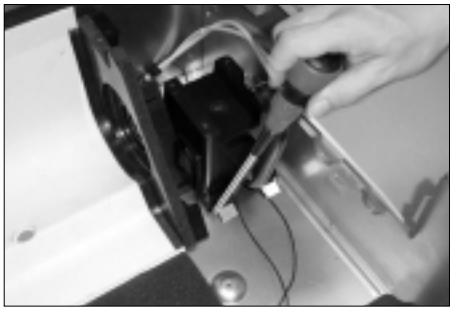
No	Parts	Procedure	Remark
1	Front Grille – Dust-Collecting Filter	1) Press the "PUSH".	
		2) Front Grille Disassembly (1) Open the Front Grille and pull it up to the direction in the picture.	
		(2) Detach the Safe Ring.	
		3) Filter Disassembly (1) Detach the Filter by disassembling the Grille hook.	

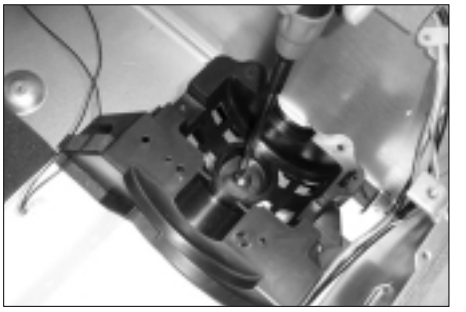
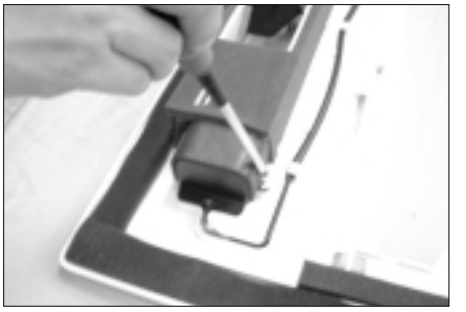
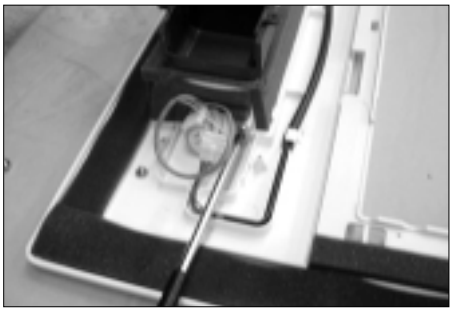
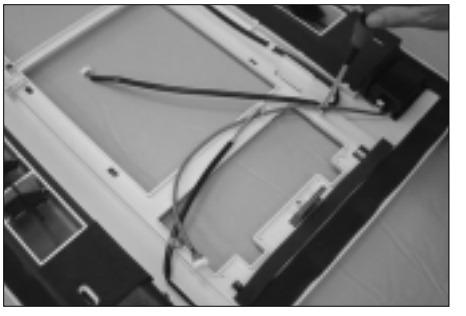
No	Parts	Procedure	Remark
		4) Detach 6 bolts and 2 fixing screws connected to the Main Body.(Mark point)	
		5) Unscrew a mark point in the picture, and detach the Cover from the Panel with pushing the hook.	
		6) Detach the connection wires of Step Motor and the receive part from the wire of a Main Body.	
		7) Widen the both hooks of panel hooked with the Main Body to both sides, and detach the Panel from the Indoor Unit.	 

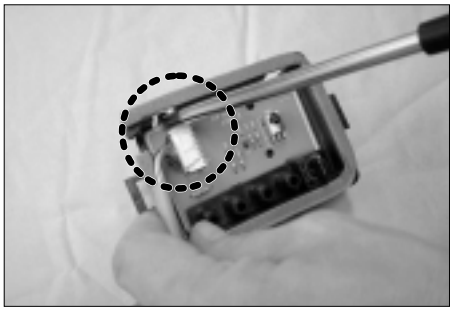
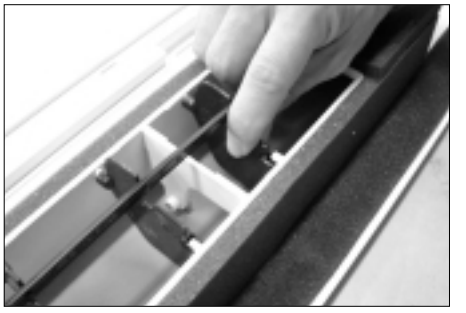
No	Parts	Procedure	Remark
2	Electronic Part –Indoor & Outdoor Connecting Cable	1) Unscrew 2 fixing screws of the Case control and screw of Thermistor wire and holder.	
		2) Push the hook, and pull the knob of a case.	
		3) Detach the indoor and outdoor connection wire cable connected to the Terminal.	
		4) Detach the Fan Motor connection wire, Heat Exchanger Sensor connection wire, and the Drain Pump Float S/W connection wire from the connecter.	
		5) Detach the Control Box from the main body.	

No	Parts	Procedure	Remark
3	EVAP ASS'Y	1) Unsrew 3 screws connected to the main body and Cover Side.	
		2) Detach the Cover Side if from the main body.	
		3) Unscrew 16 screws connected to the Drain Pan and the main body.(Mark point)	
		4) Detach the Drain Pan from the main body.	
		5) Unscrew 4 Heat Exchanger screws connected to the cabinet body and cover Evap Guide.	

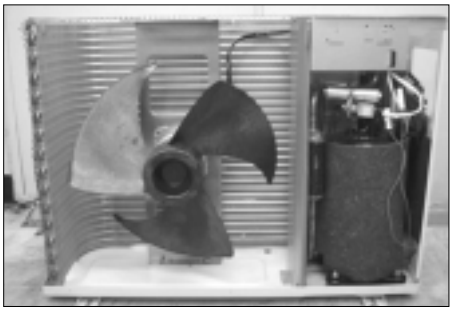
No	Parts	Procedure	Remark
		6) Detach the Drain Pump Sensor from the holder, and detach the Heat Exchanger from the main body by pushing it to the direction of Drain.	
4	Fan & Motor	1) Unscrew 4 screws of Cover Motor and Evap Guide connected to the Case Motor.	
		2) After detaching the Cover Motor by pushing the hook, detach the Cover Evap Guide.	
		3) Detach the Motor and Fan from the case. (Use M3 wrench when detaching the Motor from the Fan.)	

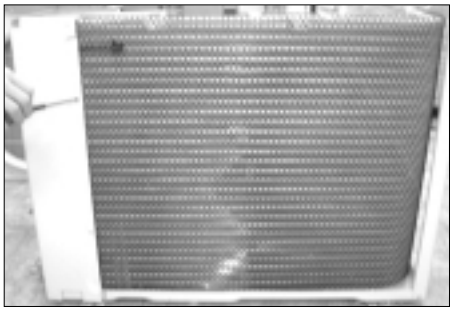
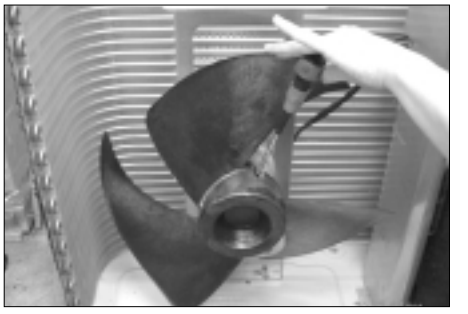
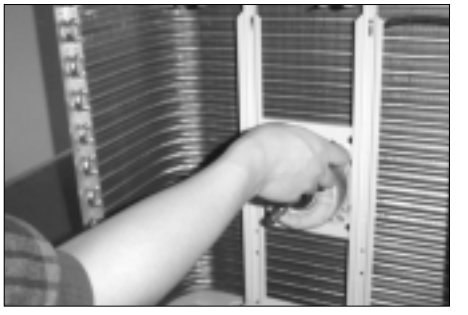
No	Parts	Procedure	Remark
5	Drain Pump	1) Detach the Drain Hose connected to the Drain Pump by loosening the spring.	
		2) Unscrew 4 screws connected to the Holder Pump and Drain Pump.	
		3) After connector detaching, detach the Drain Pump from the holder.	
6	Other Parts	1) In case of the other parts, detach it like a picture when necessary.	 

No	Parts	Procedure	Remark
			
7	Front Panel	1) Unscrew 2 screws of the Holder Motor fixed on the Panel, and detach the Holder Motor. The Panel, and detach the Holder Motor.	
		2) Unscrew 2 screws of the Step-Motor, and detach the Step-Motor from the Panel.	
		3) Detach the cable clamp screw.	
		4) Push the hook of case PCB to the both sides and detach the case from the Panel.	

No	Parts	Procedure	Remark
		5) When detaching the PCB from the case, unscrew the 6 screws and push the hook at the mark.	
		6) When detaching the blade, detach the opposite side first of Step Motor after turning over the guide on the Panel.	
		7) When detaching the Blade V, after detaching the link by pushing, detach the blade with pushing to the direction of arrow.	

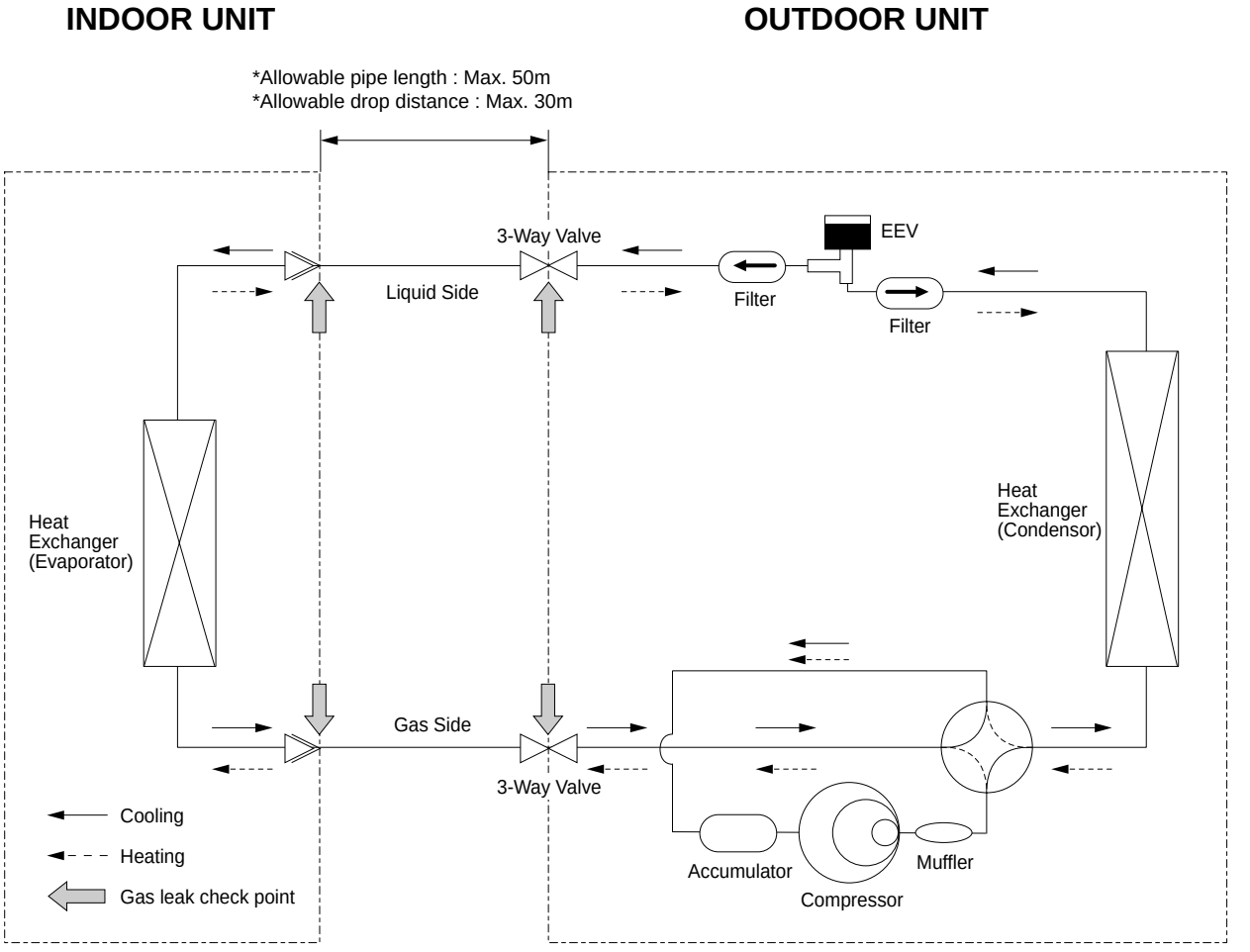
4-2 Outdoor Unit

No	Parts	Procedure	Remark
1	Common Work	1) Loosen the fixing screws and separate the Cover Control. 2) Separate the connection wire from the Terminal Block.	
		3) Loosen the fixing screws and separate the Upper Cabinet.	
		4) Loosen the fixing screws and separate the Front Cabinet.	
		5) Loosen 2 screws and pull up the Control Box.	
		6) Separate the terminal cover and separate the Comp lead wire.	

No	Parts	Procedure	Remark
		7) Loosen the fixing screws and separate the Cabinet Side.	
2	Fan & Motor	1) Loosen the fixing bolt and separate the Fan.	
		2) Loosen 4 fixing bolts to separate the Motor.	

No	Parts	Procedure	Remark
3	Heat Exchanger & Compressor	1) Release the refrigerant at first. 2) Disassemble the inlet and outlet pipe by welding. 3) Loosen the fixing screws of the Heat Exchanger. 4) Separate the Heat Exchanger. 5) Loosen four bolts of the Compressor. 6) Separate the Compressor.	

5. Refrigerating Cycle Diagram



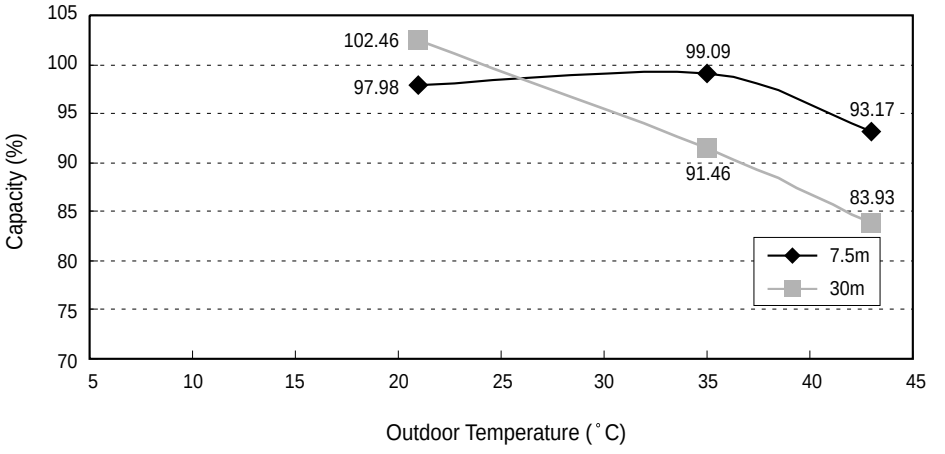
5-2 Refrigerant Cycle Characteristic

5-2-1 Capacity Distributions

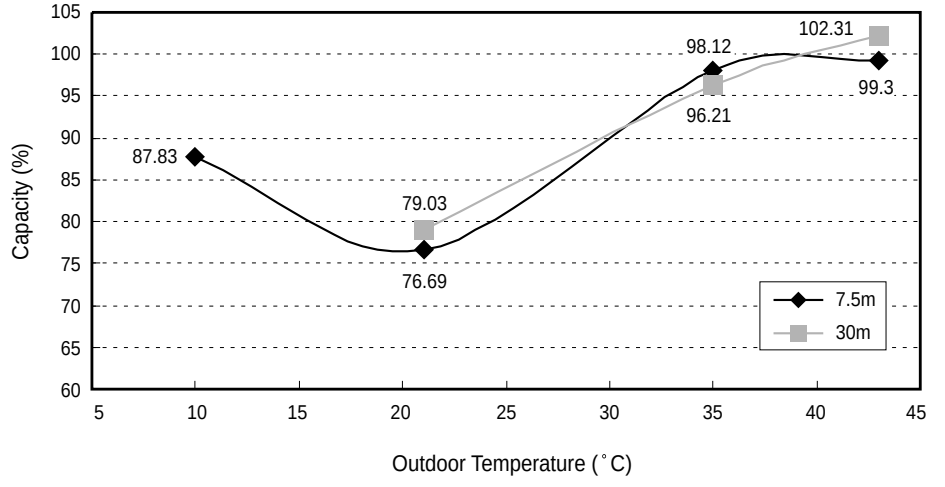
Capacity Distributions according to indoor and outdoor temp. variation.

■ COOLING MODE

■ GH052EAM

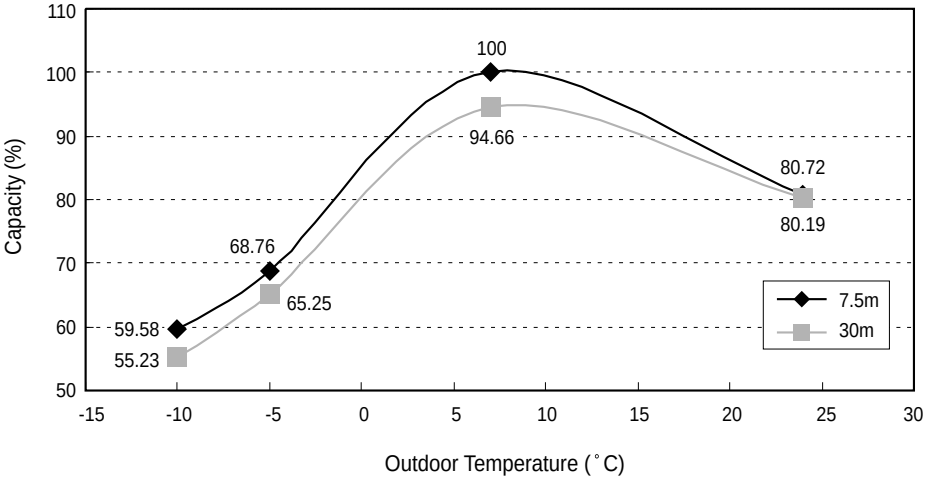


■ GH070EAM

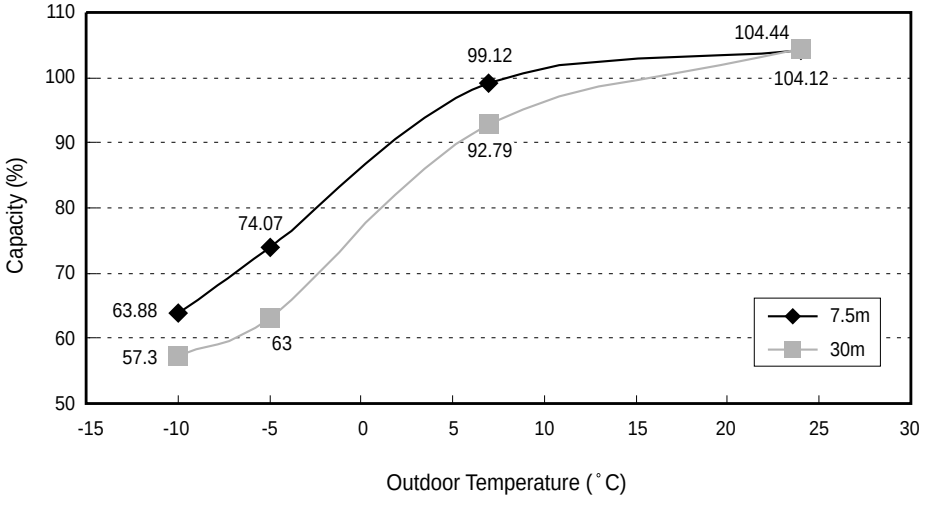


■ HEATING MODE

■ GH052EAM



■ GH070EAM

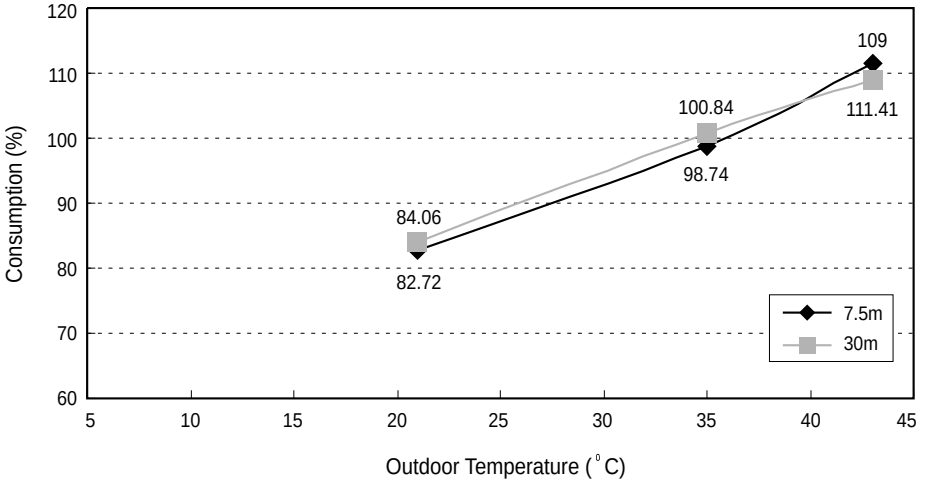


5-2-2 Power Consumption Distributions

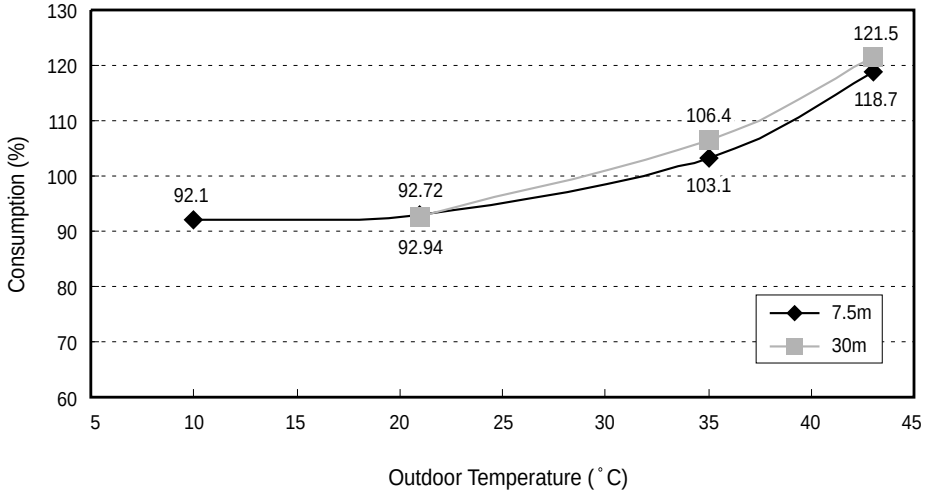
Power Consumption Distributions according to indoor and outdoor temp. variation.

■ COOLING MODE

■ GH052EAM

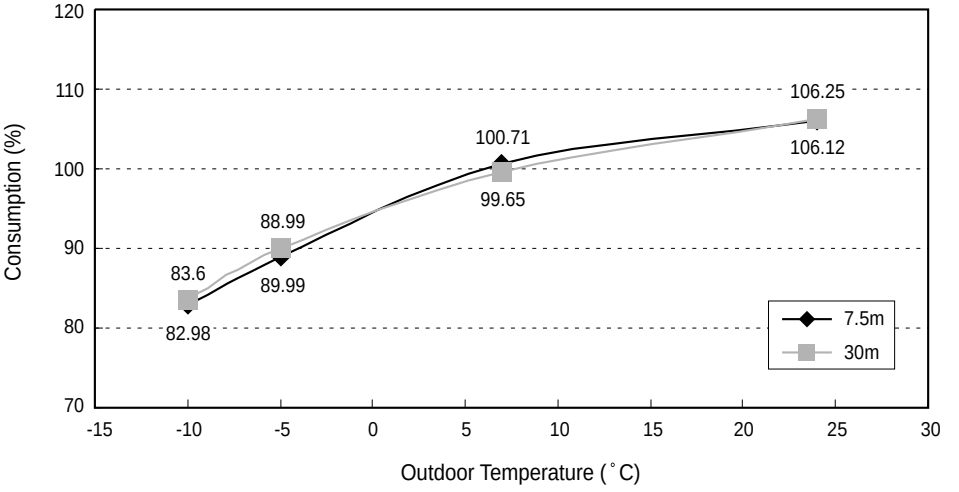


■ GH070EAM

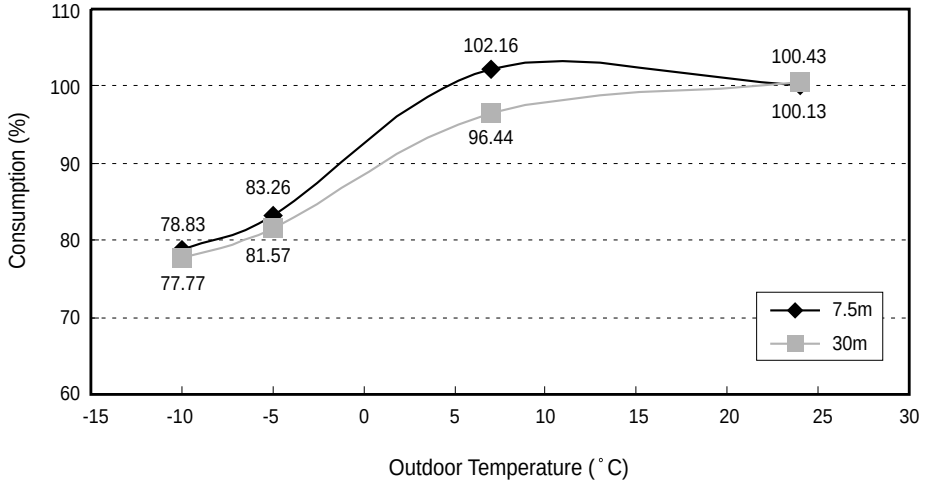


■ HEATING MODE

■ GH052EAM



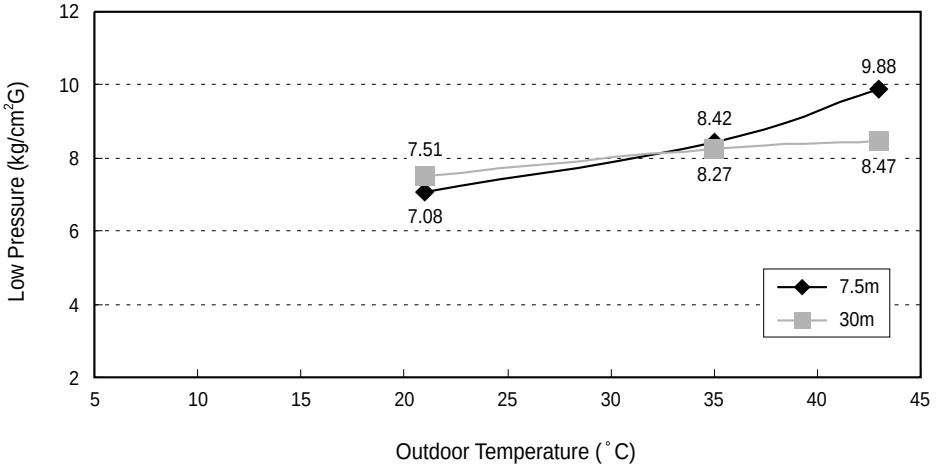
■ GH070EAM



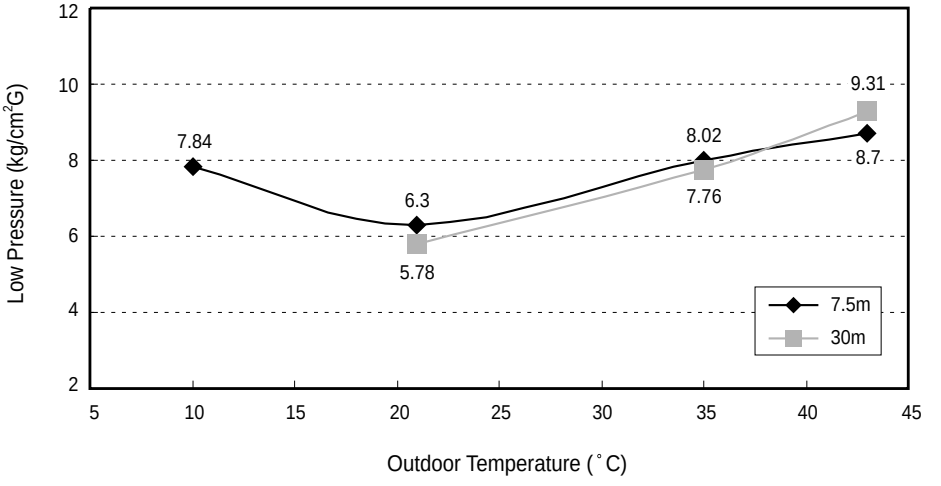
5-2-3 Low Pressure Distributions

■ COOLING MODE

■ GH052EAM



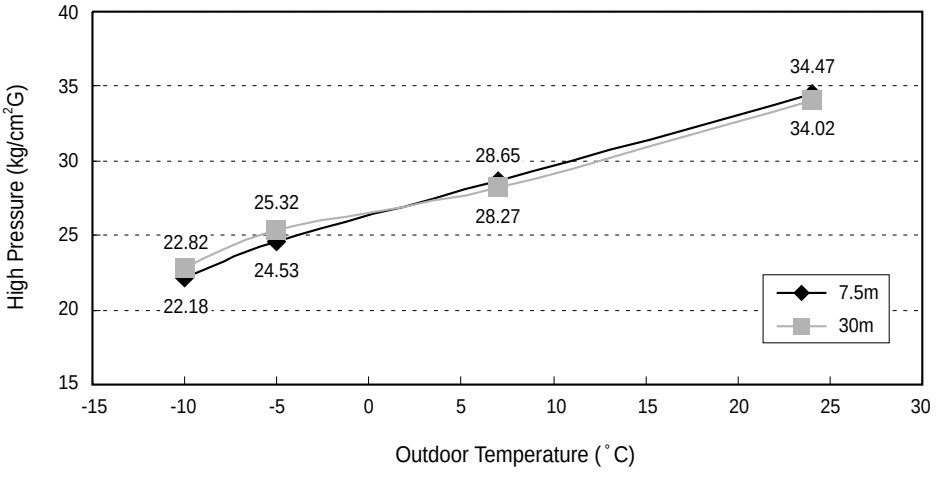
■ GH070EAM



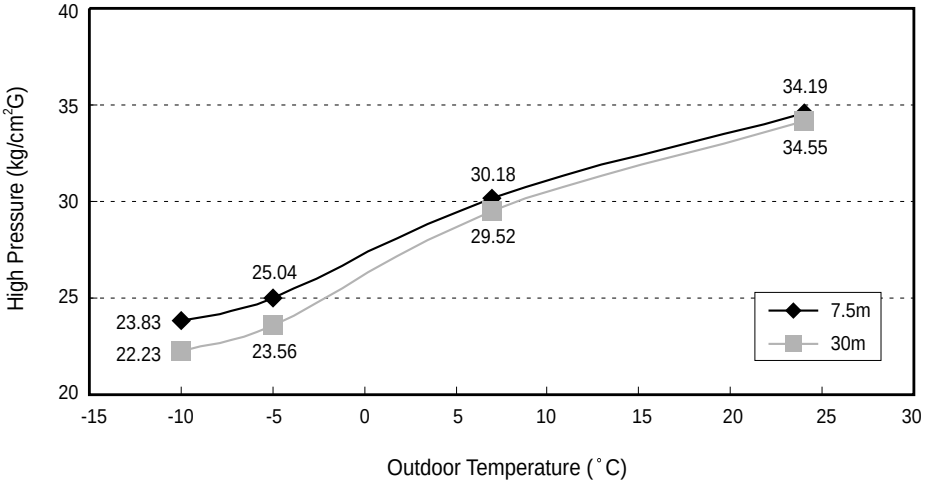
5-2-4 High Pressure Distributions

■ HEATING MODE

■ GH052EAM

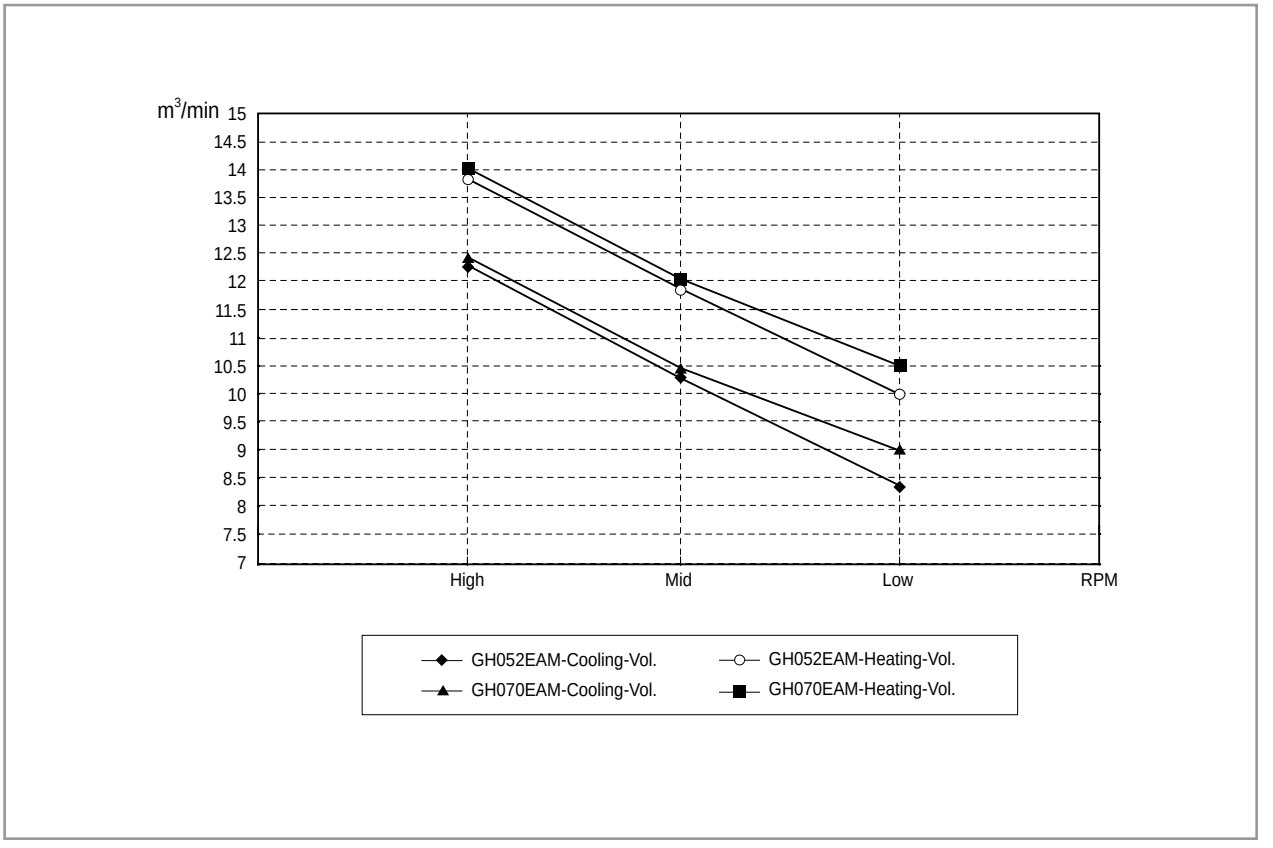


■ GH070EAM



5-2-5 Air Volume according to the RPM variation(High/Mid/Low)

■ Indoor Unit

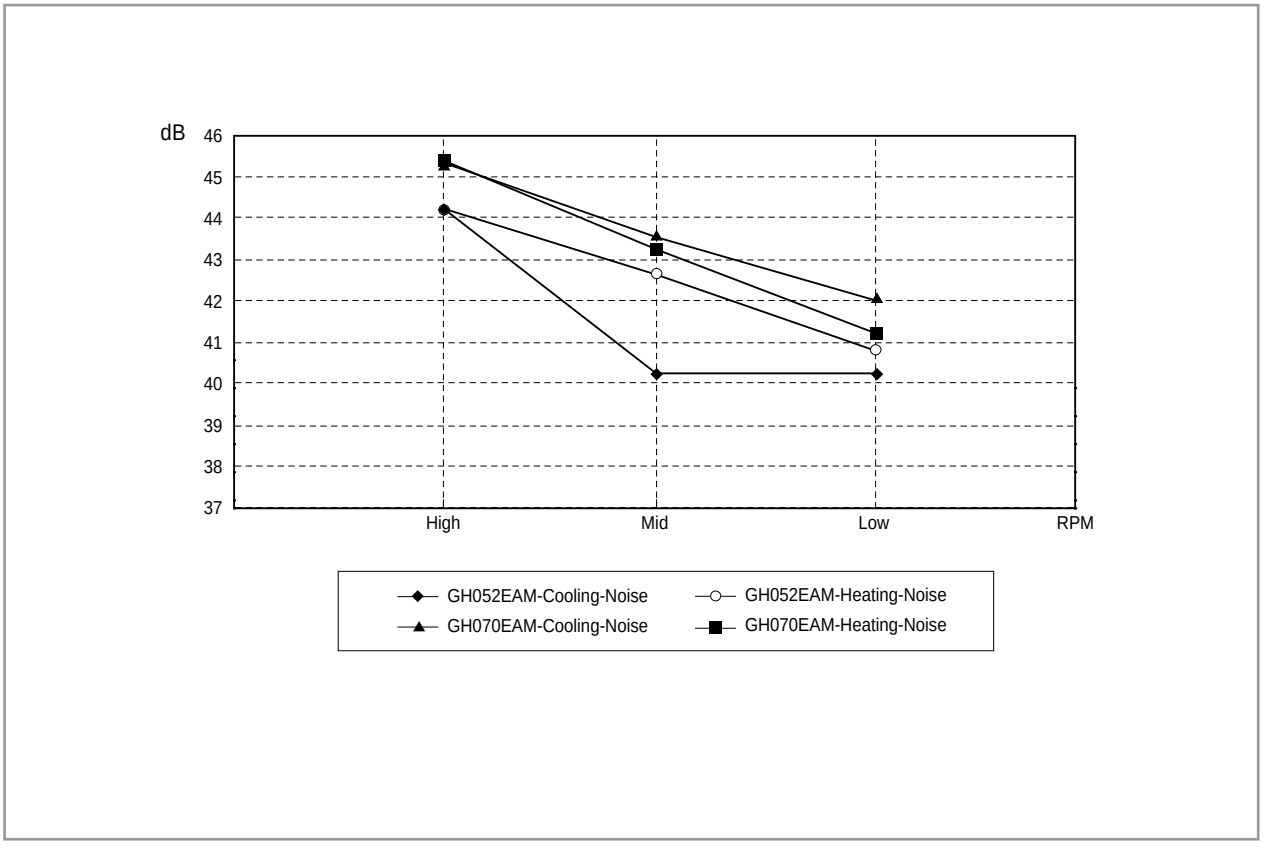


■ Outdoor Unit

- UH052EAMT : 45m³/ min
- UH070EAMT : 51m³/ min

5-2-6 Noise Level according to the RPM variation(High/Mid/Low)

■ Indoor Unit



■ Outdoor Unit

Section	Operation	Noise(dB)	Remark
UH052EAMT	Cooling	61	
	Heating	61	
UH070EAMT	Cooling	61	
	Heating	61	

5-3 Cautions Of using for R410A

■ HFCs

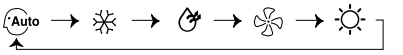
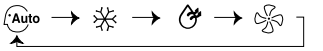
1. When installing or removing or servicing an air conditioner, do not allow air or moisture to remain in the refrigeration cycle.
2. When evacuating an air conditioner, always use the vacuum pump and sufficiently evacuate an air conditioner.
3. Certainly use the specified lubricant(Polyol ester oil), valve and dryer.

■ Lubricants

1. Synthetic Oils : POE, PVE, PAG, AB
2. POE is made from Acid and Alcohol
   RCOOH(Carboxylic Acid) + R'OH(Alcohol) ↔ RCOOR'(Ester) + H_2O(Water)
3. Hydrolysis causes Metallic Soap
   RCOOR' + H_2O → RCOOH + R'OH
   FeO + 2RCOOH → $Fe(COOR)_2$(Carboxylic Acid Iron(slurgy))

6. Feature & Operation

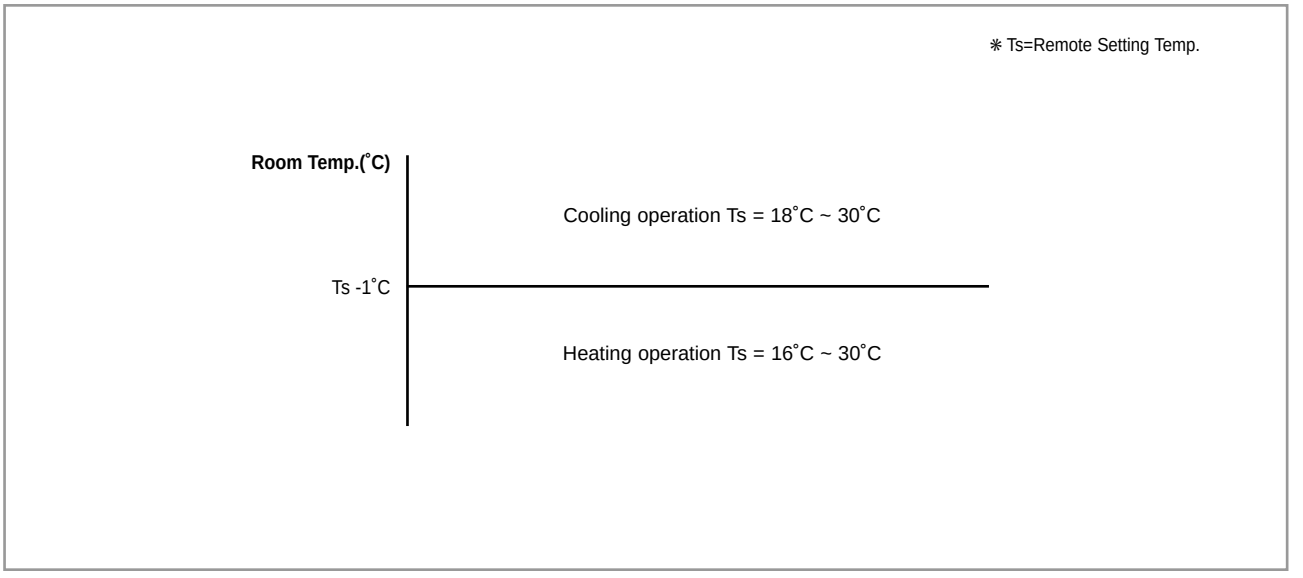
6-1 The Feature of Key in remote control

No	BUTTON	FUNCTION
1		On/Off & Timer Set/Cancel button. Press the button to stop and run the air conditioner or set up On/Off timer.
2		Mode selection button. Each time you press this button, mode is changed in the following order. Auto : Auto Mode : Fan Mode : Cool Mode : Heat Mode : Dry Mode ▶ **In case of Heat pump model**  ▶ **In case of Cooling only model** 
3	(UP)	Temp. adjustment button(UP). The temperature is increase by the pressing the temp. button.
	(DOWN)	Temp. adjustment button(DOWN). The temperature is decrease by the pressing the temp. button.
4		Filter Reset button. When the filter lamp is on the indoor DISPLAY part, replace the filter and press the reset button.
5		Fan speed adjustment button. Each time you press this button, FAN SPEED is changed in the following order.
6		Swing button. It adjusts the airflow to upward and downward.
7		On Timer button. The On Timer enables you to **switch on** the air conditioner automatically after a given period of time that is from 30 minutes to 24 hours. To cancel, press the (Set/Cancel) button.
8		Off Timer button. The Off Timer enables you to **switch off** the air conditioner automatically after a given period of time that is from 30 minutes to 24 hours. To cancel, press the (Set/Cancel) button.

6-2 Details for Operation Property

6-2-1 Automatic control

● **Automatic operation mode**



1. First selection of auto control at the other operation mode.
   When auto operation on from off state
   To determine the initial operation mode by comparing the room temp. and desired temp. (Ts)
   - Room Temp. (Tr) ≥ Desired temp.(Ts) - 1˚C : cooling mode
   - Room Temp. (Tr) < Desired temp.(Ts) - 1˚C : heating mode

2. Wind velocity control
   - Auto cooling operation : auto operation for wind velocity of cooling
   - Auto heating operation : auto operation for wind velocity of heating

3. Default temp. after RESET
   → Setting temp. = 24˚C(18˚C ~ 30˚C able to set)
   Air flow setting = Auto

● **To re-determine the operation mode (AUTO-CHANGE-OVER)**

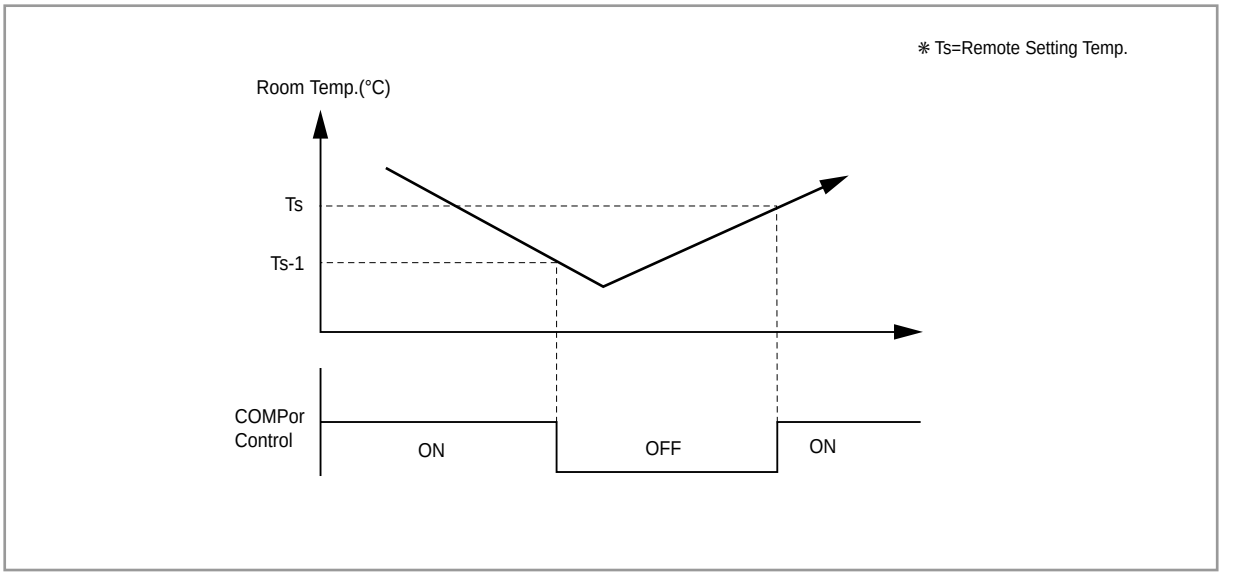
1. In case of cooling mode of the operation mode set at the initial auto operation.
   When operating with Room temp.(Tr) ≤ Setting temp.(Ts) - 1˚C for more than 30 minutes, reset the operation mode.

2. In case of heating mode of operation set at the initial auto operation.
   When operating with Room temp. (Tr) ≥ Setting temp.(Ts) + 1 + Δ T ˚C for more than 30 minutes, reset the operation mode.
   (ΔT = offset temp. of heating by option(switch No. K5) 2˚C / 5˚C)

6-2-2 Cooling operation control

● Operation Pattern

1. COMPor ON/OFF control



● Operation specification

1. Control of Setting temp.
   → remote control setting : 18˚C ~ 30˚C

2. COMPor ON/OFF control
   → Compressor turn on/off control according to the setting temp. and room temp.
   → COMPor off : "Room temp. ≤ setting temp.(Ts)-1"
   → COMPor on : "Room temp. ≥ setting temp.(Ts)"

3. Air flow control
   → Operation by the wind velocity set at the remote control

4. Air flow direction control
   1) A Initial air flow direction when resetting the power source
      → An internal angle 30˚ position

5. Initial setting value
   → Setting temp.(Ts) = 24[˚C]
      Air flow set = Air flow auto

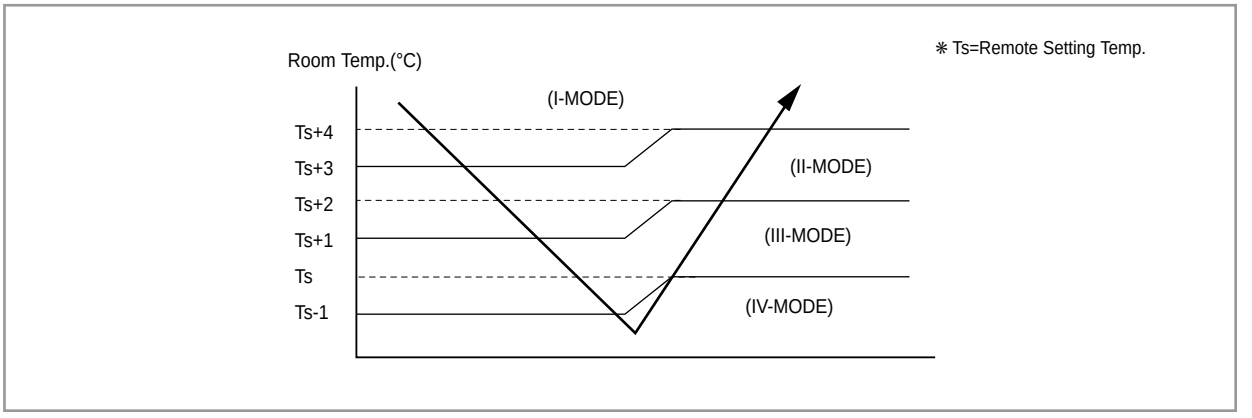
6. Control according to indoor heat exchanger temp.
   → Protection by Anti-freezing control (low temp. release)

7. THERMO ON/OFF Delay control
   When Indoor unit THERMO ON → OFF, 20 seconds delay of THERMO OFF. (including in operation ON/OFF)

8. THERMO OFF control
   - When comp off by the room temp. thermo off.
     Indoor fan speed → low, louver angle → minimum control

6-2-3 Dehumidifier control

● Operation Pattern

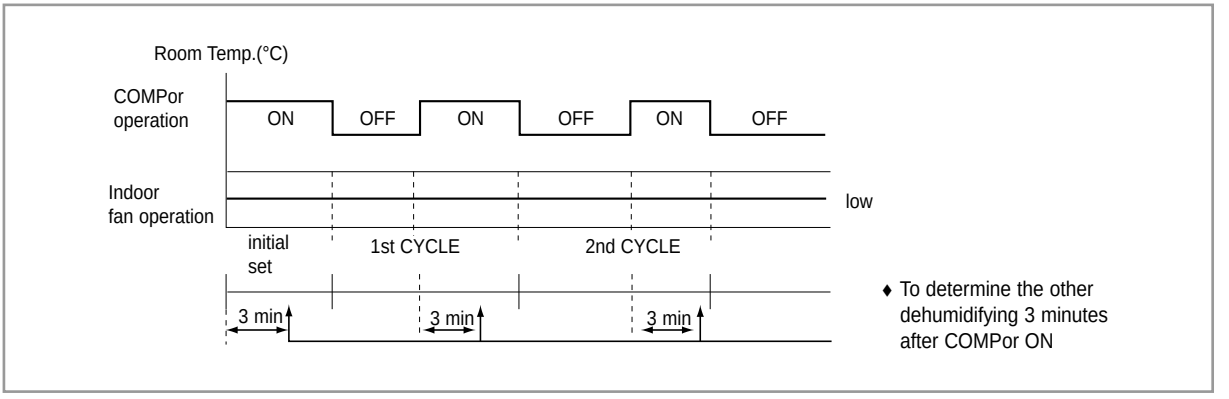


● Operation spec

1. On/Off time as per dehumidifying mode and operation cycle indoor

COMPor & Indoor Fan	Operation Cycle(Min.)			
	Ⅰ-Mode	Ⅱ-Mode	Ⅲ-Mode	Ⅳ-Mode
ON Time	6 Min.	5 Min.	3 Min.	$COMP^{OR}$=OFF
OFF Time	4 Min.	5 Min.	6 Min.	

2. COMPor and indoor fan operation fan cycle



1) Check the room temp. 3 minutes after compressor On every cycle to determine the next cycle.
   → To determine the other cycle by monitoring the room temp. continuously at "Ⅳ-MODE"
2) The 6 minutes delay (including 3 minutes delay) after dehumidifying operation set shall be operated by compressor on, indoor fan = low.
3) Operation by compressor = on/off (mode Ⅰ, Ⅱ, Ⅲ, Ⅳ) from the dehumidifying "1st CYCLE" indoor fan = low

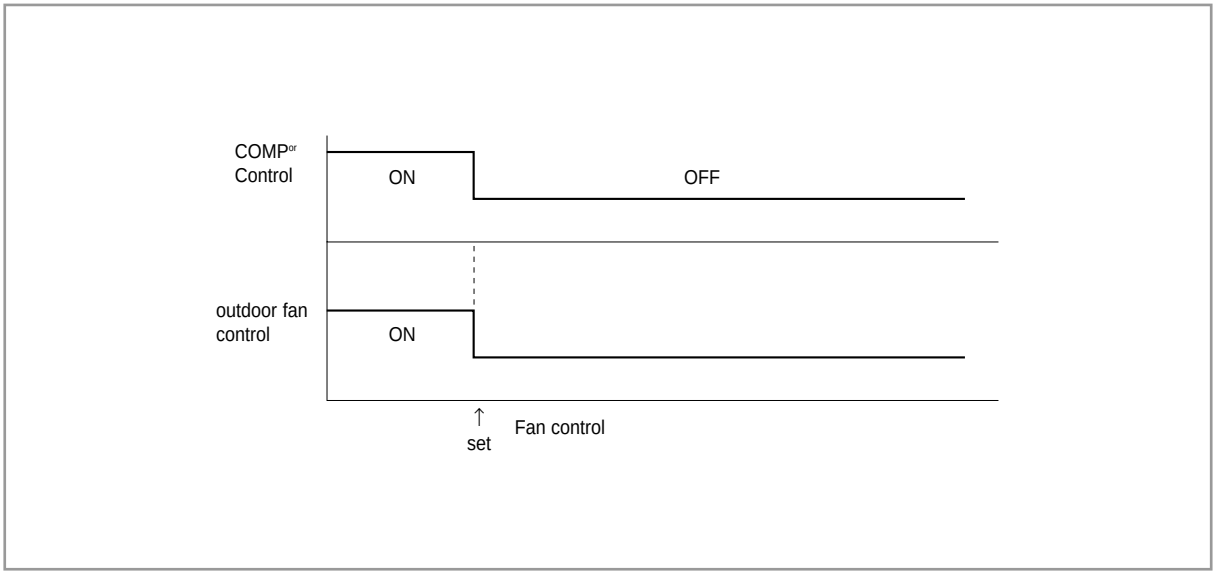
3. Air flow direction control → according to the set of remote control

4. Default temp. after Reset(Ts) : 24˚C

6-2-4 Fan operation mode control

● Operation Pattern

1. COMPor and outdoor fan control



2. Indoor fan control

Remote control display	Indoor fan mode
natural wind	natural wind
▂▄▆	High
▂▄	Mid
▂	Low

● Operation specification

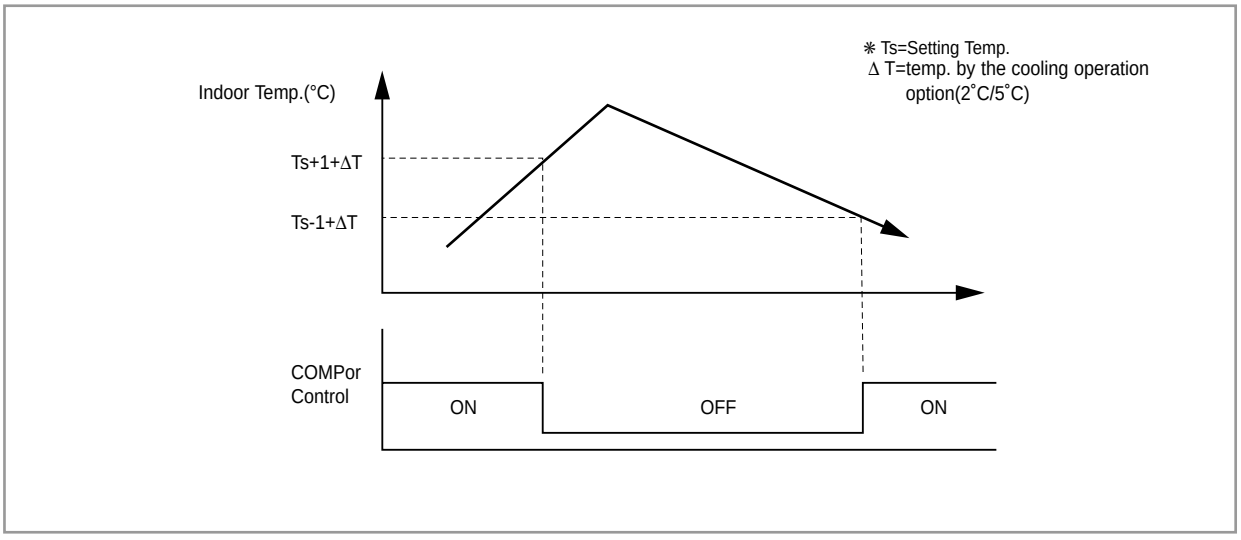
1. When receiving the signal of Fan control from Remote control.
   → Outdoor power RELAY OFF (COMPor OFF, outdoor fan OFF), indoor fan operating by the setting Fan mode.
   → **"low → mid → high → natural wind"** to be changed in order.

2. Set Fan mode by low when resetting the initial reset.

3. Air flow direction control (left and right) (upper and lower)
   1) Initial air flow direction during power reset
      → An internal angle 33.88° position, left and right louver SWING OFF
   2) Upper / lower louver : upper / lower control referred
   3) Left/right louver : left/right louver control referred

6-2-5 Heating operation control

● Operation Pattern



● Operation specification

1. COMPor ON/OFF Control
   Control of compressor on/off by the indoor temp. and setting temp.
   1) Compressor on/off control by the room temp.
      → Compressor Off at "room temp. = desired temp.(Ts)+1+ΔT"
      → Compressor On at indoor temp. = desired temp.(Ts)-1+ΔT".
   2) Compressor control according to the indoor heat exchanger temp.
      → Following the high load prevention control (high temp. release).
      → Having the priority over Compressor by the indoor temp.

2. Air flow control
   1) Fan control by the room temp.
      → Air flow control by the remote control.
   2) Fan speed control by the indoor heat exchanger
      → According to the cool air prevention control and high load prevention control (high temp. release)
      → To have the priority over the wind velocity control by the room temp.

3. Air direction control
   → according to the set of remote control.

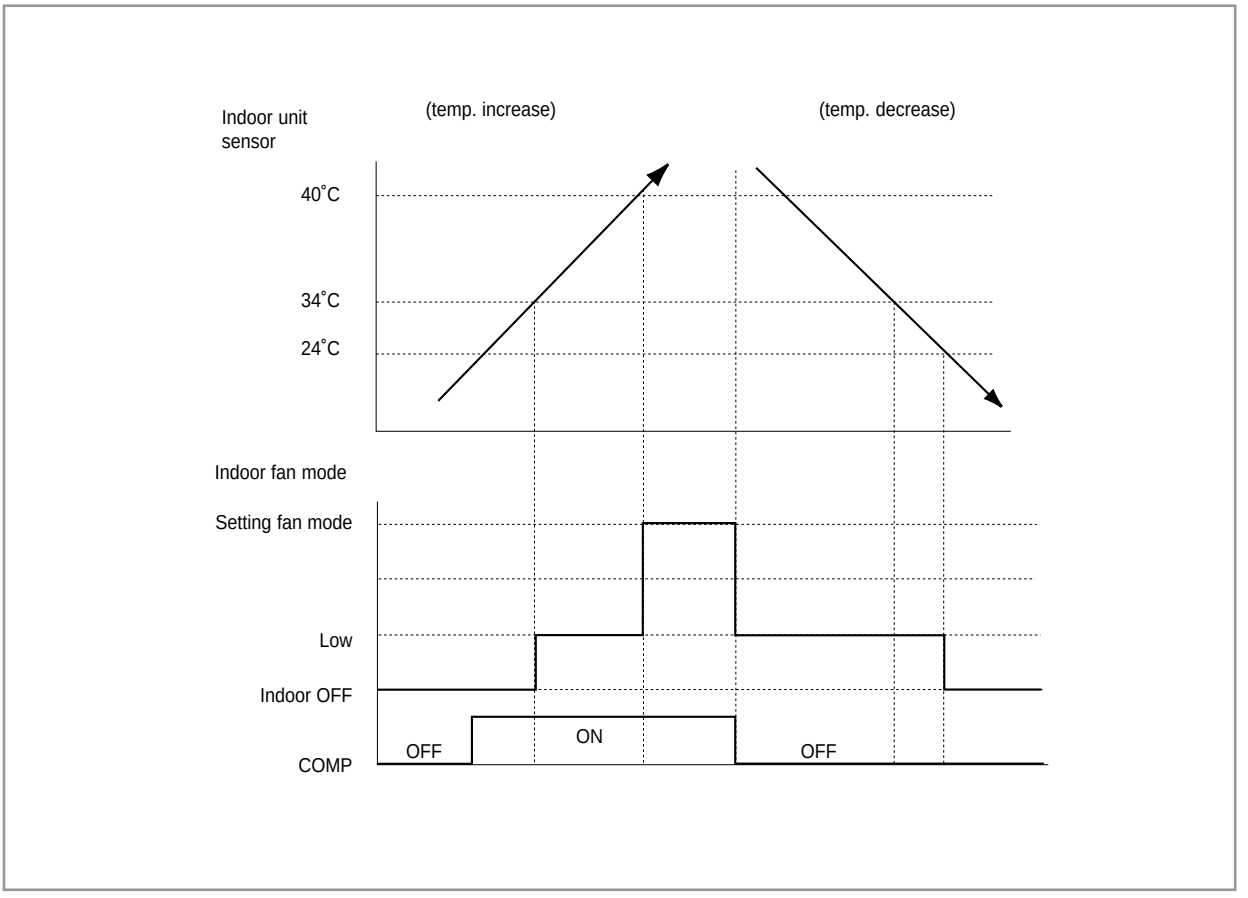
4. Initial after reset
   → Setting temp.(Ts) = 24[˚C]
      Air flow setting = auto

5. THERMO ON/OFF delay control
   Two minutes delay of thermo off when indoor unit THERMO ON → OFF(including operation on/off)

6. THERMO OFF control
   When compressor off due to the thermo off of set temp. and room temp.
   Indoor fan → low, louver angle → minimum control

6-2-6 Cold draft control

● **Operation Pattern**



● **Indoor fan control**

1. To control the indoor fan according to the temp. of indoor heat exchanger
   1) COMPor ON
      - Temp. rise of indoor heat exchanger
        indoor heat exchanger temp. < 34˚C → indoor fan : OFF
        indoor heat exchanger temp. 34˚C ≤ 40˚C → indoor fan mode : Low
        indoor heat exchanger temp. ≧ 40˚C → indoor fan mode : setting mode.
      - Adjust Fan mode automatically for controlling cold draft.
   2) COMPor OFF
      Indoor heat exchanger temp. ≧ 24˚C → indoor fan mode : Low
      Indoor heat exchanger temp. < 24˚C → indoor fan mode : OFF

2. Exceptions
   If it is "Indoor fan ON + COMPor on", the indoor fan is not turn off automatically even if the temp. of evaporator decrease under 24˚C.
   ✳ **Even during the comp off operation, the fan on is maintained if the condition is fan on.**

6-2-7 The protection control by the condensing temp. on heating mode. (The indoor unit sensor)

● **Control method : Protection control by the condensing temp.(indoor unit pipe sensor)**

protection control by the condensing temp. during heating (pipe sensor)	1. COMP DOWN 1) When the room pipe temp. is above 70˚C during heating, the comp shall be stopped immediately and restart it 3 minutes and under 50 ˚C. ✻ In case of 2-WAY CASSETTE, there are two Indoor unit pipe sensors.(determind the higher temp. between 2 sensors for heating mode.)

6-2-8 Outdoor fan control(Heating)

1. Purpose

The indoor fan shall be controlled according to the outdoor temp. during heating to maintain the exhaust temp. constantly (condensing pressure) and to maintain the outdoor pipe temp. (evaporation pressure) at a certain level.

2. Outdoor fan control

• **2 FAN control**

MODE	UPPER FAN	LOWER FAN
2	H	H
1	L	L
0	Stop	Stop

• **1 FAN control**

MODE	FAN
2	H
1	L
0	Stop

3. Outdoor fan control as per outdoor temp.

Items	Heating
Outdoor fan control	1) Outdoor temp. > 30˚C : outdoor fan → STOP + (STOP) (Applicable temp. is exceeded if outdoor temp. is above 30˚C) - COMPor OFF. - Indoor fan : cold draft control 2) 12˚C < outdoor fan ≤ 30˚C :outdoor fan → LOW + (LOW) ▶ 2-FAN model : outdoor fan → LOW + LOW ▶ 1-FAN model : outdoor FAN → LOW 3) Outdoor temp. ≤ 12˚C : outdoor fan → HIGH + (HIGH) ✻ For two fans, HIGH + HIGH For one fan HIGH

4. Fan control by the indoor pipe sensor (condensing temp.) in case of outdoor temp. > 12˚C

1) detection method : when maintaining for 2 seconds with indoor pipe temp. ≥ 53˚C
: Outdoor fan FAN 1 STEP down (ie, for two fans, LOW + LOW → STOP + STOP
For one fan, LOW → STOP)

2) Control reset(restore to the previous fan step)
: When maintaining for two seconds with Indoor fan pipe temp. ≤ 48˚C or exceeding 120 seconds with outdoor fan off,

✻ **Operate the outdoor fan with minimum F seconds when restarting the outdoor fan.**

F second OPTION time : 5, 10, 20, <u>30</u> seconds

6-2-9 Outdoor fan control(cooling)

1. Purpose

The outdoor fan shall be controlled according to the outdoor temp. during cooling to maintain the indoor exhaust temp. constantly and to maintain the outdoor pipe temp. (condensing pressure) at a certain level.

2. Outdoor fan mode

- **2 FAN control**

MODE	UPPER FAN	LOWER FAN
3	H	H
2	L	L
1	L	Stop
0	Stop	Stop

- **1 FAN control**

MODE	FAN
2	H
1	L
0	Stop

✻ Detection method of outdoor temp. when outdoor fan off (only for cooling operation)

1) Outdoor fan off
   - COMPor ON : Ignoring the outdoor temp. detection (prevention of mis-detection of the outdoor temp. by the radiated heat)
   - COMPor OFF : Detection of outdoor temp.

2) Outdoor fan on : Ignore the outdoor temp. for 30 seconds after the fan on and afterwards detect the outdoor temp.
   - In case of ignoring the outdoor temp, it shall be acknowledged as the final temp. before the fan off.

3.Outdoor fan control method as per outdoor temp.

Items	Cooling
Outdoor fan control	1) Outdoor temp. > 30˚C : Outdoor fan → HIGH + (HIGH) ✻ For two fans, HIGH + HIGH For 1 FAN, HIGH 2) 20˚C < outdoor temp. ≤ 30˚C : Outdoor fan → LOW + (LOW) ✻ For two fans, LOW + LOW For one fan, LOW 3) Outdoor temp. ≤ 20˚C ▶ 2-FAN model : Outdoor fan → LOW(upper) + STOP(Lower) ▶ 1-FAN model : Outdoor fan → LOW

◆ Outdoor fan ≤ 12˚C

→ Fan control by detecting the outdoor pipe temp. (condensing temp.)

1) Detection method : outdoor pipe temp. ≤ 39˚C to be maintained for 10 seconds
   : Outdoor fan 1 STEP down
   (ie, For two fans LOW + STOP → STOP + STOP
   For one fan LOW → STOP)

2) Control reset (Restore to the previous step)
   : Outdoor pipe temp. ≥ 46˚C to be mantained for two seconds or fan off for 60 seconds

6-2-10 Anti-freezing control (cooling)

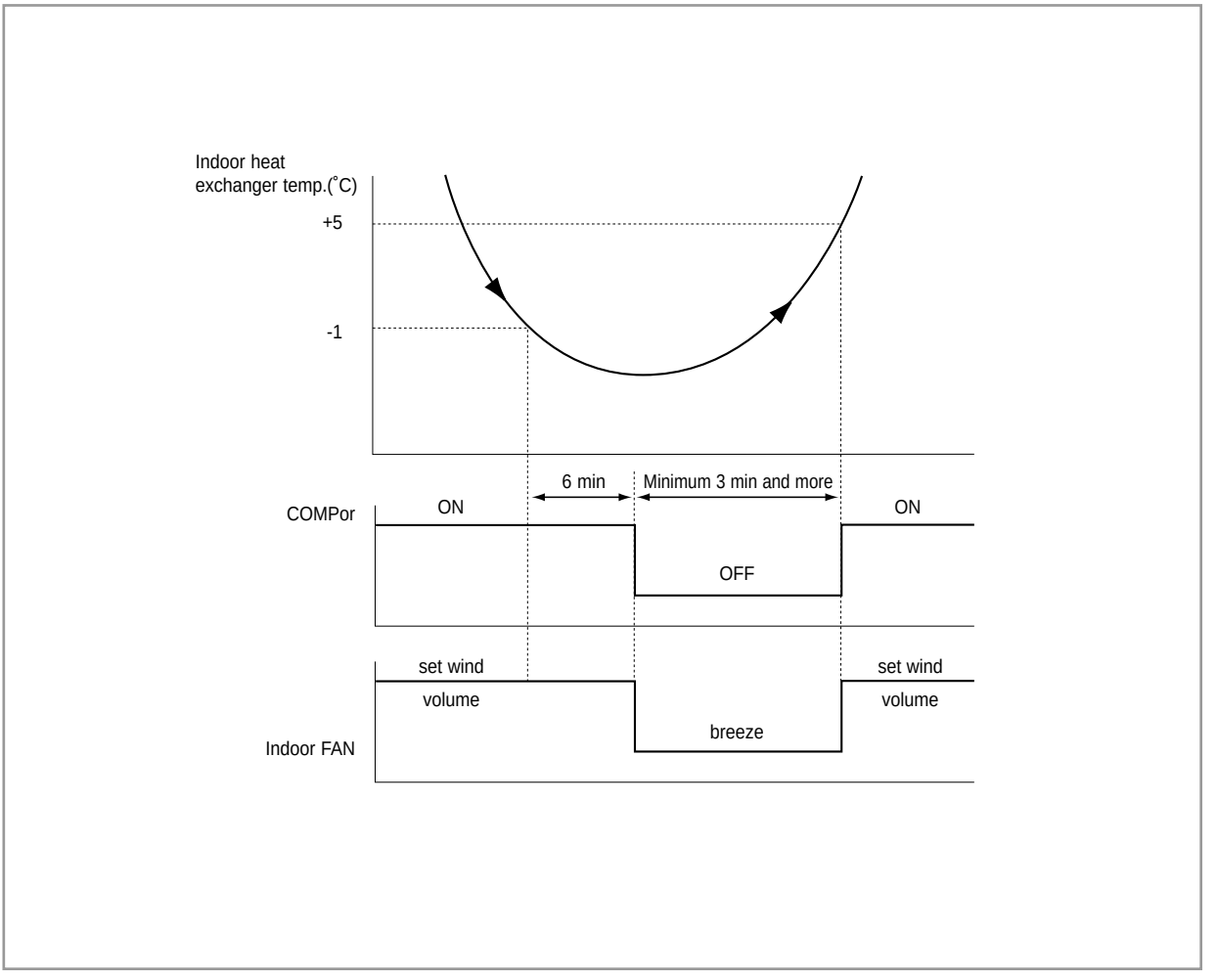
1. Control method

1) Compressor off when the temp. of indoor heat exchanger maintains at under -1˚C for 6 minutes. and if it exceeds +5˚C, cancelling compressor off.
2) Detect 30 minutes after compressor starts if it starts for the first time. (all initial operation) However, If the indoor heat exchanger temp. is lower than -10˚C, the compressor shall stop immediately.
3) Immediate detection for the restart of compressor after off due to the anti-freezing control. (If it reaches -1˚C 30 seconds after start, start to count from the time.)
4) On/off to restart the compressor without limit for antifreezing on off of compressor.

2. Conditions

1) Base of indoor heat exchanger temp. : Controlled by the lowest temp. of Indoor unit pipe sensors.

✻ For 2-WAY CASSETTE, there are two Indoor unit pipe sensors and use the lower temp. one for cooling and higher one for heating.



6-2-11 Defrost control(2,000 STEP / 480 STEP)

● **Purpose**

For the removal of frost on the outdoor heat exchanger during heating, operate in the cooling mode.

1. Defrost mode change over determination / start condition
   1) **(T_COIL ≤ C x T_AIROUT - α) & (T_COIL ≤ -5˚C) when maintaining for 5 minutes**
      outdoor heat exchanger pipe sensor temp. : T_COIL
      outdoor temp. : T_AIROUT
      T_COIL : Outdoor unit pipe sensor temp.
      T_AIROUT : Outdoor temp.
      C : outdoor air constant
         T_AIROUT < 0˚C : C → 0.8
         T_AIROUT ≥ 0˚C : C → 0.6
      α : Defrost temp. constant (L=12, M=10, N=8)
         factory delivery set value M=10

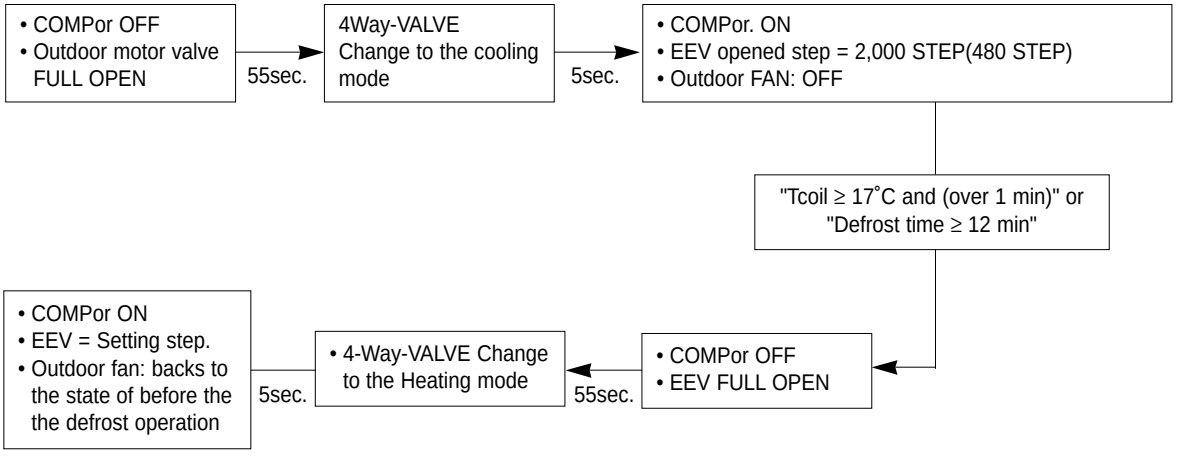
2. Control specification during the defrost operation (cooling mode)
   a. compressor : ON
   b. EEV(Electronic Expansion Valve) 2000 STEP (or 480STEP)
   c. indoor fan stop (for avoiding cold draft)
   d. outdoor fan stop

3. Reset of defrost operation : **"T_COIL ≥ 17˚C & 1 minute" or "defrost time ≥ 12 minutes"**
   a. EEV(Electronic Expension Valve)
   b. indoor / outdoor fan defrost operation restoring sometimes to heating mode.

4. Deny Acesse of defrost mode for 30 minutes after compressor start. .

5. No protection control(discharge/condensing. freezing/outdoor fan control) and self diagnosis are not made during defrost operation and 10 minutes after completion.

■ **FLOW DIAGRAM**


• COMPor OFF
• Outdoor motor valve FULL OPEN
55sec.
4Way-VALVE Change to the cooling mode
5sec.
• COMPor. ON
• EEV opened step = 2,000 STEP(480 STEP)
• Outdoor FAN: OFF
"Tcoil ≥ 17˚C and (over 1 min)" or "Defrost time ≥ 12 min"
• COMPor OFF
• EEV FULL OPEN
55sec.
• 4-Way-VALVE Change to the Heating mode
5sec.
• COMPor ON
• EEV = Setting step.
• Outdoor fan: backs to the state of before the the defrost operation

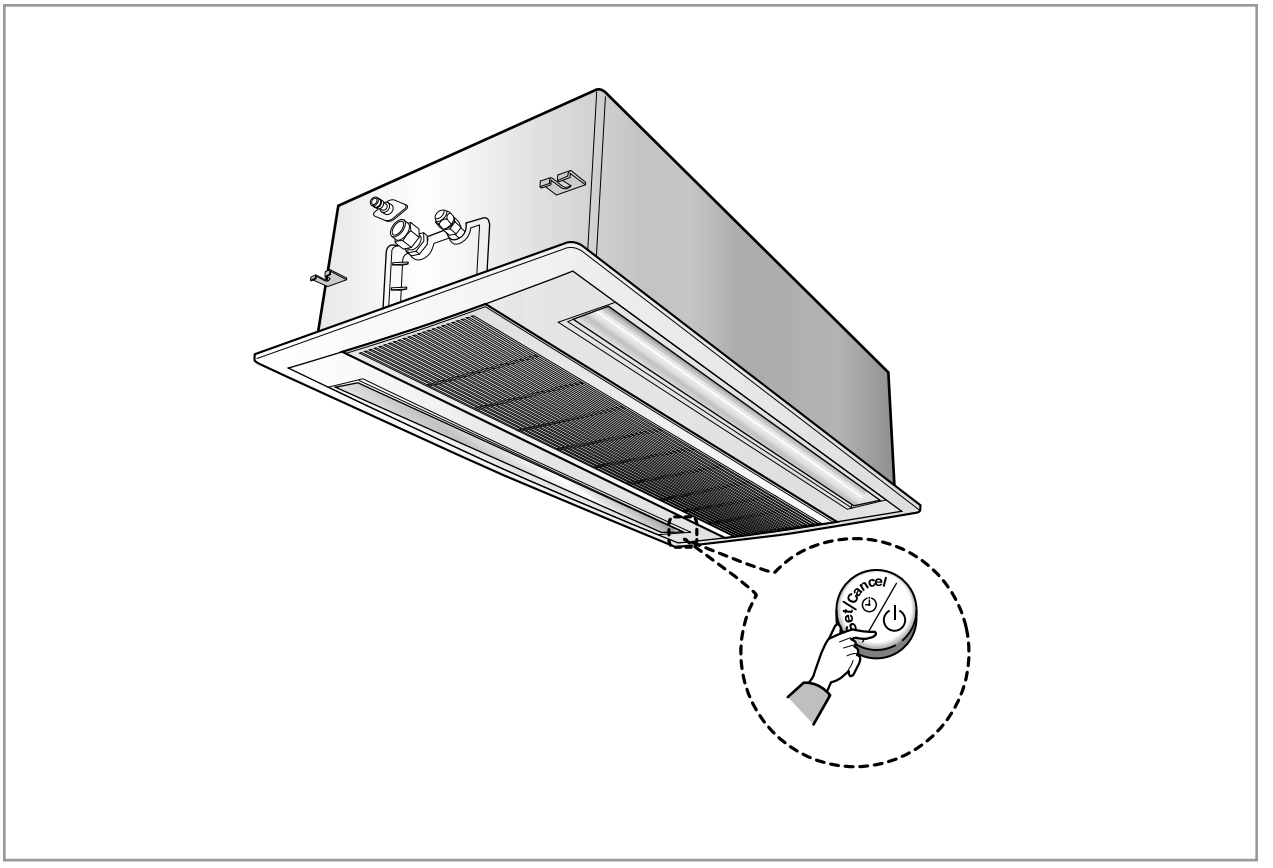
6-2-12 Test Operation Method

1. Press the ON/OFF button of the indoor unit for at least 5 seconds.

2. Check the operation of the set mainly for the following points.
   1) OPERATION MODE : COOLING
   2) FAN SPEED : HIGH
   3) BLADE-H : SWING
   4) DISPLAY : OPERATING LED ON
   5) OUT DOOR LOAD : OUT FAN ON, COMP ON

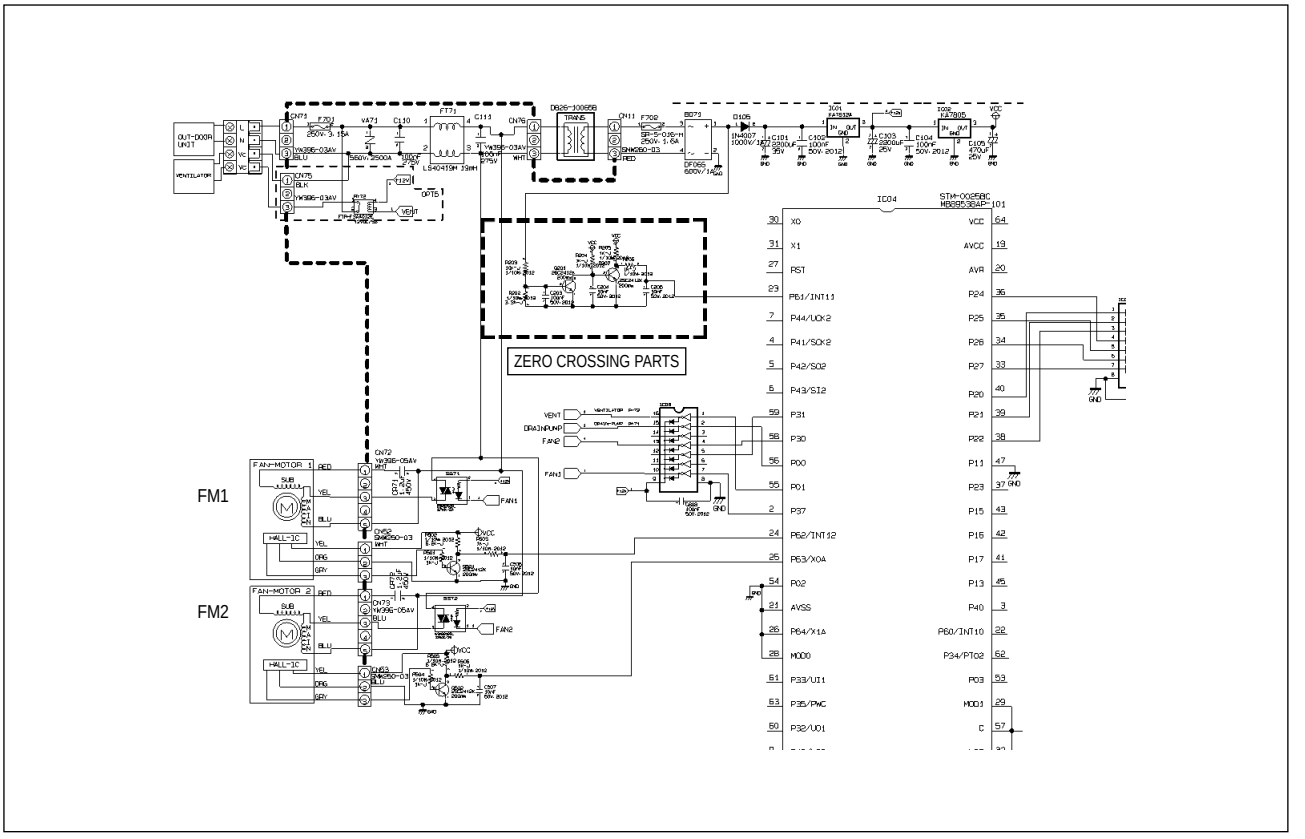
3. Check if the set is in normal operation.

4. Press the ON/OFF button again to switch the power off.



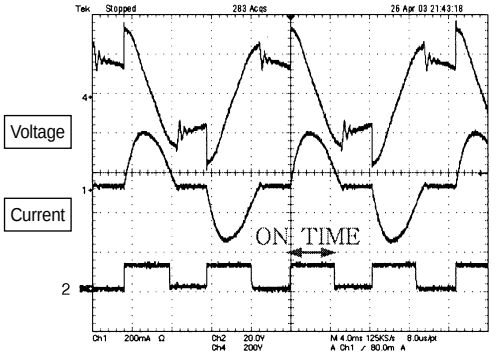
6-3 Circuit Description

6-3-1 Indoor Fan Control

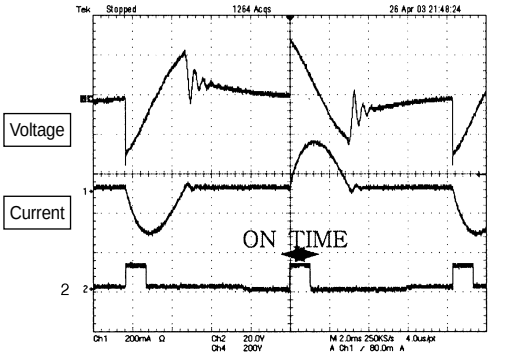


- Use SSR(Solid State Relay) of Micom to change the ON Time until the 220V sine wave equals the fan motor rpm to control. In the meantime, the Zero Crossing part will recognize AC220V as 0V to determine the Switching Timing.
  As the Fan Control Port of Micom detects the "High" signal and the signal turns into "Low" past TR-Array(UL2003), the LED of SSR obtains 12V, the same input wave with "2" and the Gate of Photo Triac obtains the operating voltage at the same time to determine the time to turn on SSR. Now the indoor fan motor can operate at the desired rpm.
- For 2-Way, control two fans simultaneously.(FM1, FM2)

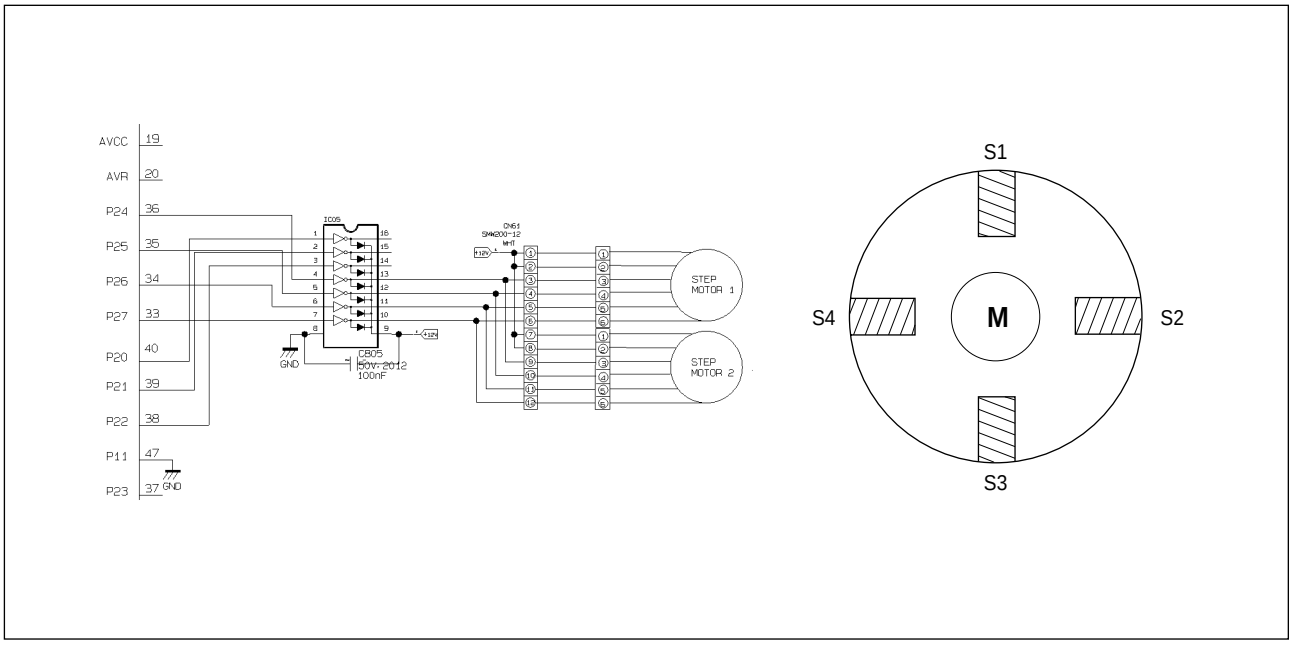
High RPM



Low RPM



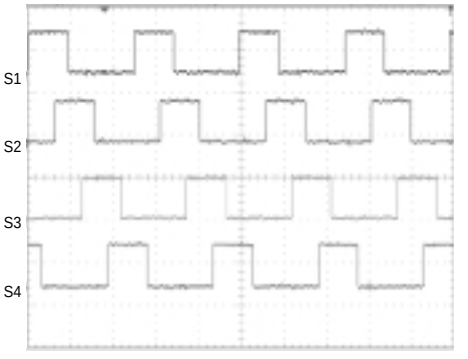
6-3-2 Stepping Motor Control



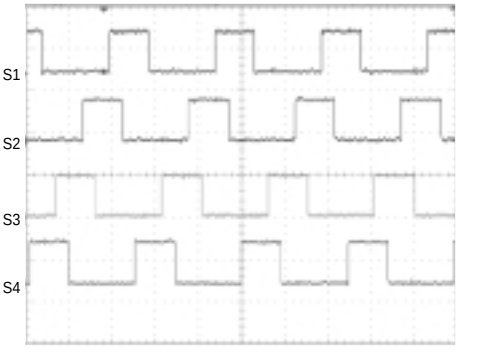
■ As shown in the above figure, let the electric currents in sequence flow through the 4 windings to revolve the stepping motor. Of 3 methods of 4 couple stepping switch sequence, 1 Phase Exciter Method, 2 Phase Exciter Method, and 1-2 Phase Exciter Method, the last method was adopted for this circuit. Based on this method, the signals come in the order of S1, S2, S3, and S4 to create magnetic force and one frequency forms a cycle. When S1, S2, S3, and S4 receive the following signals respectively, the stepping motor begins operation.

Power OFF (Closing) CCW ("1"=HIGH)								Switch	Power ON (Opening) CW ("0"=LOW)							
1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8
1	1	0	0	0	0	0	0	S1	0	0	0	0	0	1	1	1
0	1	1	1	0	0	0	0	S2	0	0	0	1	1	1	0	0
0	0	0	1	1	1	0	0	S3	0	1	1	1	0	0	0	0
0	0	0	0	0	1	1	1	S4	1	1	0	0	0	0	0	0

Power OFF



Power ON



7. Set Up the Model Option

7-1 Setting Option Setup Method

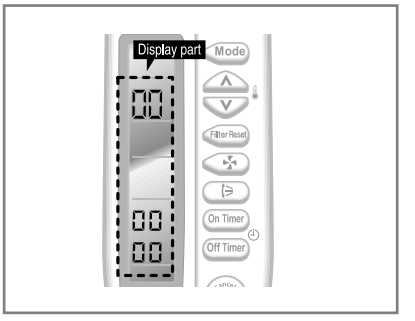
ex) Option No. : 08511 5-1 d2340

Step 1 : **Enter the Option Setup mode.**

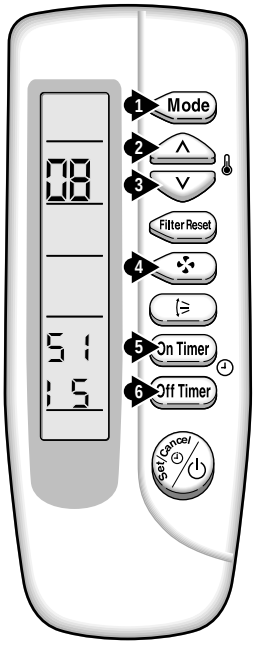
1st Take out the batteries of remote control.

2nd Press the temp. button simultaneously and insert the battery again.

3rd Make sure the remote control display shown as 00 00 00 .



Step 2 : **Enter the Option Setup mode and select your option according to the following procedure.**



✻ Setting is not required if you must 0 a value which has a 0 default.

1

The default value is 00 00 00 .
Otherwise, push the Mode button to 0 .
Every time you push the button, the display panel reads 1 or 0 repeatedly.

2

Push the button to set the display panel to 8 .
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

3

Push the button to set the display panel to 5 .
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

4

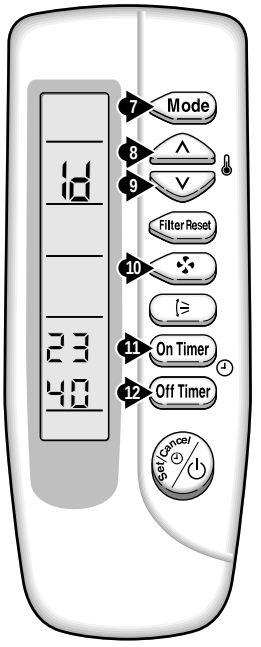
Push the button to set the display panel to 1 .
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

5

Push the On Timer button to set the display panel to 1 .
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

6

Push the Off Timer button to set the display panel to 5 .
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.



* Setting is not required if you must 0 a value which has a 0 default.

7

Press Mode button, then the default value is 10 88 .

8

Push the ∧ button to set the display panel to d .
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

9

Push the ∨ button to set the display panel to 2 .
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

10

Push the button to set the display panel to 3 .
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

11

Push the On Timer button to set the display panel to 4 .
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

12

Push the Off Timer button to set the display panel to 0 .
Every time you push the button, the display panel reads 0 ➡ 1 ➡ 2 ➡ 3 ➡ · · · 9 ➡ A ➡ b ➡ c ➡ d ➡ E ➡ F repeatedly.

Step 3 : Upon completion of the selection, check you made right selections.

Press the Mode Selection key, Mode to set the display part to 0 and check the display part.

➡ The display part shows 08 51 15 .

Press the Mode Selection key, Mode to set the display part to 1 and check the display part.

➡ The display part shows 1d 23 40 .

Step 4 : Pressing the ON/OFF button ( )

When pressing the operation ON/OFF key with the direction of remote control for unit, the sound "Ding" or "Diriring" is heard and the OPERATION ICON( ) lamp of the display is flickering at the same time, then the input of option is completed. (If the diriring sound isn't heard, try again pressing the ON/OFF button.)

Step 5 : Unit operation test-run

First, Remove the battery from the remote control.

Second, Re-insert the battery into the remote control.

Third, Press ON/OFF button( ) with the direction of remote control for set.

• Error Mode

1st If all lamps of indoor unit are flickering, Plug out, plug in power plug again and press ON/OFF key to retry.

2nd If the unit is not working properly or all lamps are continuously flickering after setting the option code, see if the correct option code is set up for its model.

■ OPTION ITEMS

REMOTE CONTROL / MODEL	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6	SEG7	SEG8	SEG9	SEG10	SEG11	SEG12
GH052EAM	0	2	5	4	4	2	1	A	0	3	7	1
GH070EAM	0	2	5	4	4	2	1	c	0	3	8	2

8. Troubleshooting

■ **Detection of errors**

- If an error occurs during the operation, one or more LED flickers and the operation is stopped except the LED.
- If you re-operate the air conditioner, it operates normally at first, then detect an error again.

8-1 LED Display on the indoor unit

Abnormal conditions	Indicators					Operating
	Green	Red				
Power reset	◑	×	×	×	×	
Error of temp. sensor in indoor unit (OPEN/SHORT)	×	×	◑	×	×	Displayed on appropriate indoor unit which is operating
Error of heat exchanger sensor in indoor unit	◑	×	◑	×	×	Displayed on appropriate indoor unit which is operating
Error of outdoor temp. sensor Error of COND sensor Error of DISCHARGE sensor	◑	×	×	◑	×	Displayed on appropriate indoor unit which is operating Displayed on outdoor unit
1. No communication for 2 minutes between indoor unit and outdoor unit (communication error for more than 2 minutes) 2. Indoor unit receiving the communication error from outdoor unit 3. Outdoor unit tracking 3 minute error 4. When sending the communication error from outdoor unit the mismatching of the communication numbers and installed numbers after completion of tracking.(communication error for more than 2 minutes)	×	×	◑	◑	×	1. Error of indoor unit: Displayed on the indoor unit regardless of operation 2. Error of outdoor unit: Displayed on the indoor unit which is operating
Communication error between indoor units	◑	×	×	×	◑	
Self-diagnostic error (including the indoor unit not detected) 1. Error of electronic expansion valve close 2. Error of electronic expansion valve open 3. 2nd detection of high temp. COND 4. 2nd detection of high temp. DISCHARGE 5. Error of reverse phase 6. Compressor down due to 6th detection of freezing	×	×	◑	◑	◑	Displayed on appropriate indoor unit which is operating Displayed on outdoor unit
Error of float switch	×	×	×	◑	◑	
Error of setting option switches for optional accessories	×	×	◑	×	◑	
EEPROM error	◑	×	◑	◑	×	
EEPROM option error	◑	◑	◑	◑	◑	

- If you turn off the air conditioner when the LED is flickering, the LED is also turned off.
- If you re-operate the air conditioner, it operates normally at first, then detect an error again.

● : On ◑ : Flickering × : Off

8-2 Outdoor Unit

If an error occurs during the operation, it is displayed on the outdoor unit PCB.

Display	Explanation	Remark
Er↔P0	High temp. of Discharge (Protection control)	Error about protection control of outdoor unit
Er↔P1	High temp. of outdoor heat exchanger (Protection control)	
Er↔P5	COMP DOWN to protect being frozen	
Er↔P6	Error of momentary power failure (disappears when the unit is Off/On)	
Er↔t1	Error of OUT TEMP. sensor (OPEN/SHORT)	Errors about outdoor unit sensor (OPEN/SHORT) Detection during the operation of indoor unit (Sensing and sending errors into the communication data)
Er↔t2	Error of temp. sensor in outdoor heat exchanger (OPEN/SHORT)	
Er↔t3	Error of Discharge TEMP. sensor (OPEN/SHORT)	
Er↔E1	System Down caused by communication error after completion of tracking	Communication and indoor unit errors
Er↔E2	Mismatching of the indoor unit numbers set with those communicated after completion of tracking	
Er↔E3	Error of float switch in indoor unit	Self-diagnosis of indoor and outdoor unit (x:indoor unit address)
Er↔E5	Error of setting option switches for optional accessories	
Er↔9x	OPEN/SHORT error of room sensor in indoor unit	
Er↔rx	OPEN/SHORT error of evap in sensor in indoor unit	
Er↔ux	Error of fan starting	Displays of operating status
Er↔G4	Open error of electronic expansion valve in outdoor unit (Detected once or more times)	
Er↔G5	Close error of electronic expansion valve in outdoor unit (Detected once or more times)	
tU Flicker	Below -5°C when cooling (Outdoor temp.)	
tO Flicker	Over 30°C when heating (Outdoor temp.)	
K1, K2, K3, K4, K5 Flicker	Refer to page 15	

The order of priority : E1 → E2 → E4 → P0 → P1 → P5 → P6 → t1 → t2 → t3 → tu → to → G4 → G5 → E3 → qx → rx → vx → K1, K2, K3, K4, K5

- In case that the same error displays from multi-indoor units, the one having the faster address has the priority.

8-3 Wired remote controller

● If an error occurs, ◪ is displayed on the wired remote controller.
If you would like to see an error code, press the Test button.

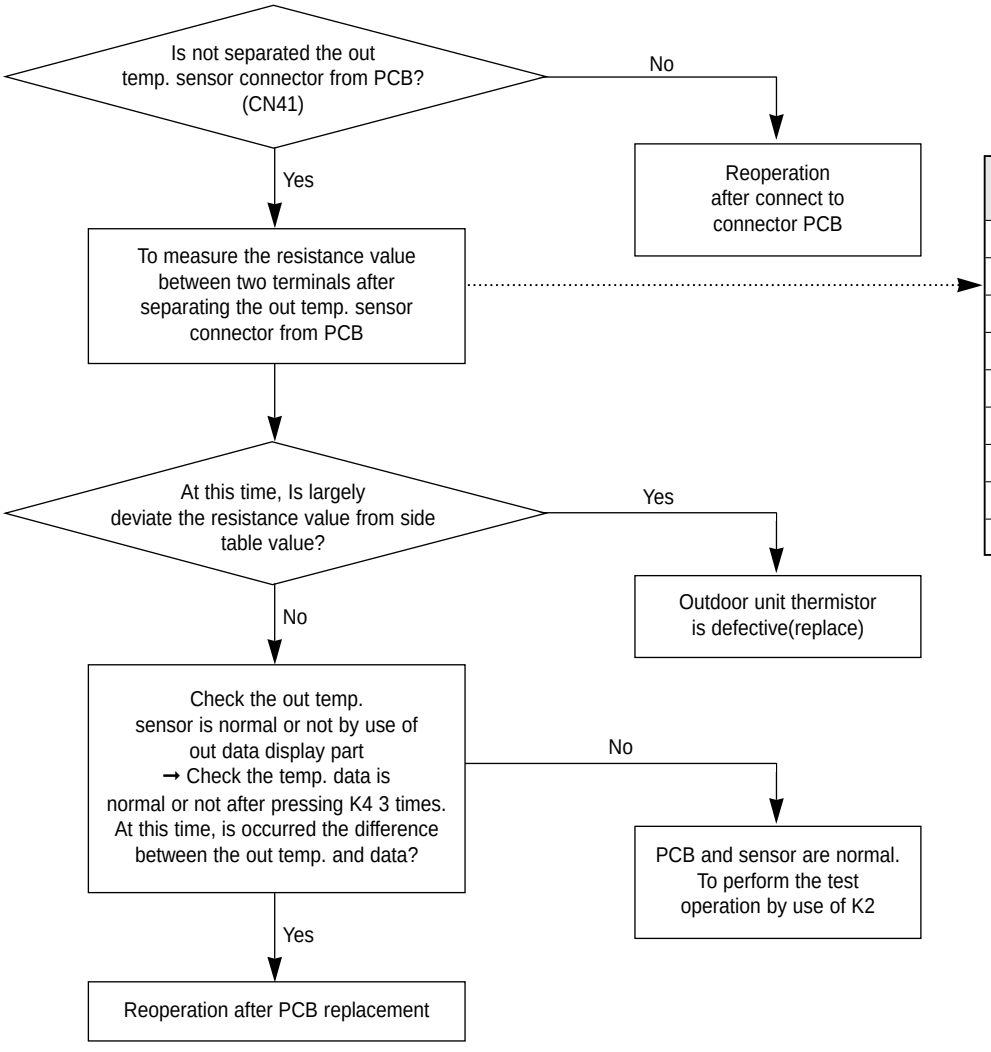
Display	Description	Remarks
Er↔EA	Error of communication between the outdoor unit and the wired remote controller	Communication errors
Er↔Eb	Error of communication between the indoor unit and the wired remote controller	
Er↔Cx	Open error of electronic expansion valve	Displays related to indoor unit (x : 0~F)
Er↔dx	Close error of electronic expansion valve	
Er↔ox	Error of float switch	
Er↔9x	OPEN/SHORT error of room sensor in indoor unit	
Er↔rx	OPEN/SHORT error of eva in sensor in indoor unit	
Er↔tx	EEPROM error	
Er↔Ux	EEPROM option error	
Er↔Eo	Error of outdoor unit	For the details, refer to the installation manual of the outdoor unit.

The order of priority : EA → Eb → Cx → dx → ox → qx → rx → tx → Ux → Eo
- In case that the same error displays from multi-indoor units, the one having the faster address has the priority.

8-4 Sequence for trouble diagnosis

8-4-1 Outdoor temp. sensor(OPEN/SHORT)

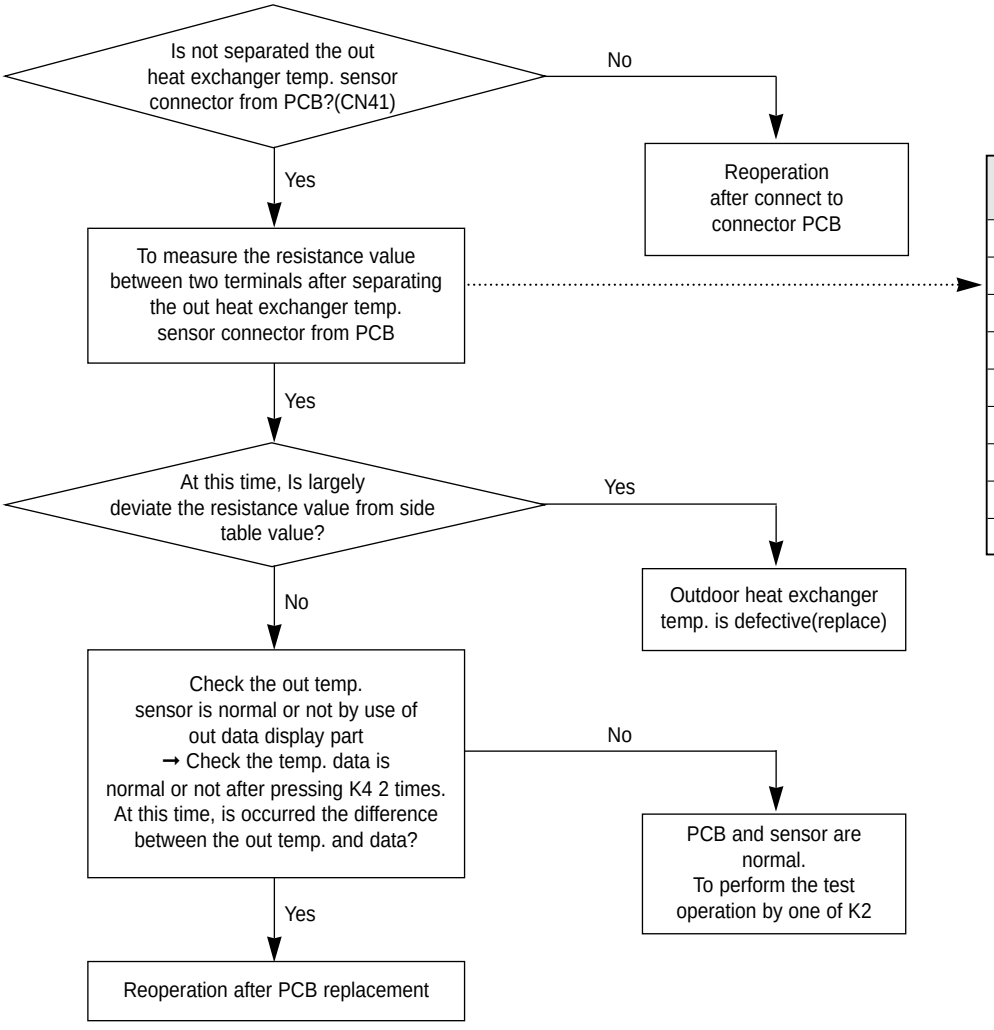
Outdoor unit display	**Er → t1 (Outdoor temp. sensor OPEN/SHORT error)**
Indoor unit display	◑ (Operation) × (Timer) ◑ (Airflow) × (Filter)
How to determine	Disconnection and short of outdoor temp. sensor
Reason of error	Disconnection or leak of applied sensor


Is not separated the out temp. sensor connector from PCB? (CN41)
No
Reoperation after connect to connector PCB
Yes
To measure the resistance value between two terminals after separating the out temp. sensor connector from PCB
At this time, Is largely deviate the resistance value from side table value?
Yes
Outdoor unit thermistor is defective(replace)
No
Check the out temp. sensor is normal or not by use of out data display part → Check the temp. data is normal or not after pressing K4 3 times. At this time, is occurred the difference between the out temp. and data?
No
PCB and sensor are normal. To perform the test operation by use of K2
Yes
Reoperation after PCB replacement

Temp. (˚C)	Resistance (kΩ)
70	2.2
60	3.0
50	4.2
40	5.8
30	8.3
20	12.1
10	18.0
0	27.3
-10	43.0

8-4-2 Outdoor heat exchanger temp. sensor error(OPEN/SHORT)

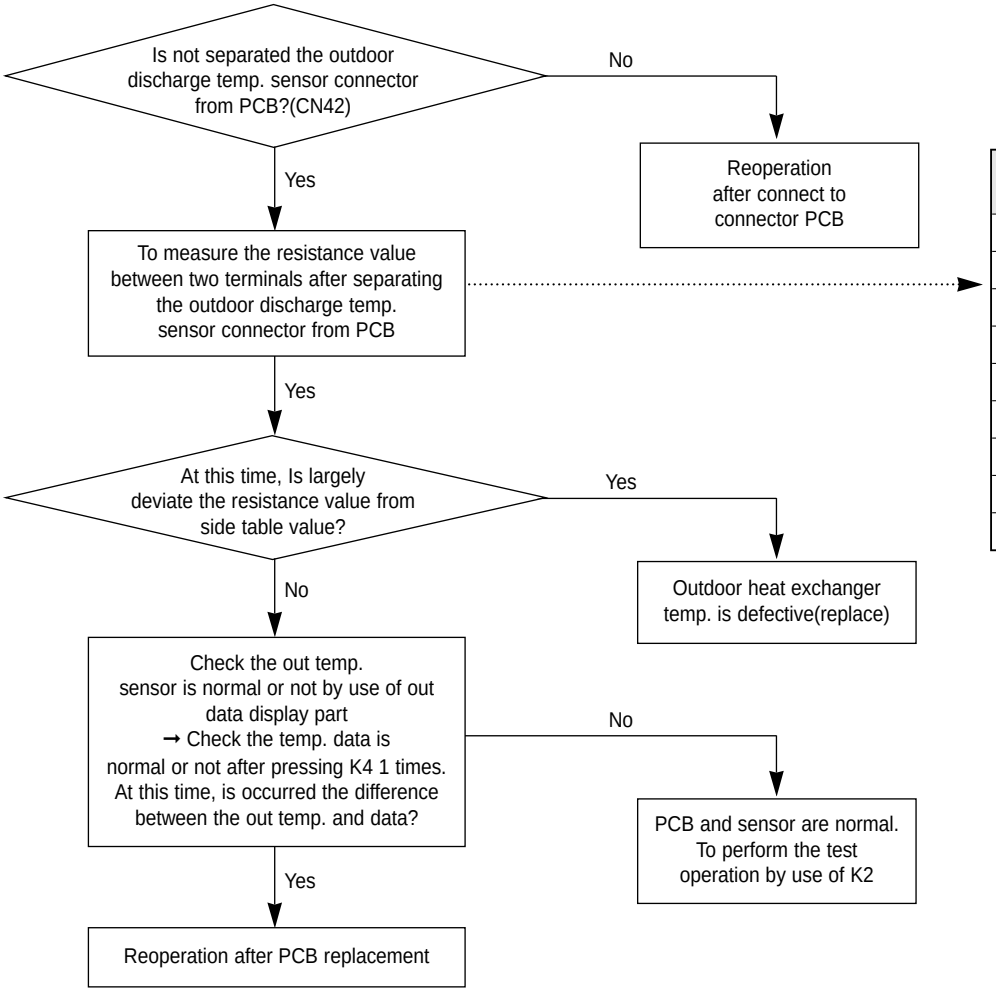
Outdoor unit display	**Er → t2 (Outdoor heat exchanger temp. sensor error(OPEN/SHORT)**
Indoor unit display	◑ (Operation) × (Timer) ◑ (Airflow) × (Filter)
How to determine	Disconnection and short of outdoor heat exchanger temp. sensor
Reason of error	Disconnection or leak of Applied sensor


Is not separated the out heat exchanger temp. sensor connector from PCB?(CN41)
No
Reoperation after connect to connector PCB
Yes
To measure the resistance value between two terminals after separating the out heat exchanger temp. sensor connector from PCB
Yes
At this time, Is largely deviate the resistance value from side table value?
Yes
Outdoor heat exchanger temp. is defective(replace)
No
Check the out temp. sensor is normal or not by use of out data display part → Check the temp. data is normal or not after pressing K4 2 times. At this time, is occurred the difference between the out temp. and data?
No
PCB and sensor are normal. To perform the test operation by one of K2
Yes
Reoperation after PCB replacement

Temp. (˚C)	Resistance (kΩ)
70	2.2
60	3.0
50	4.2
40	5.8
30	8.3
20	12.1
10	18.0
0	27.3
-10	43.0

8-4-3 Outdoor discharge temp. sensor error(OPEN/SHORT)

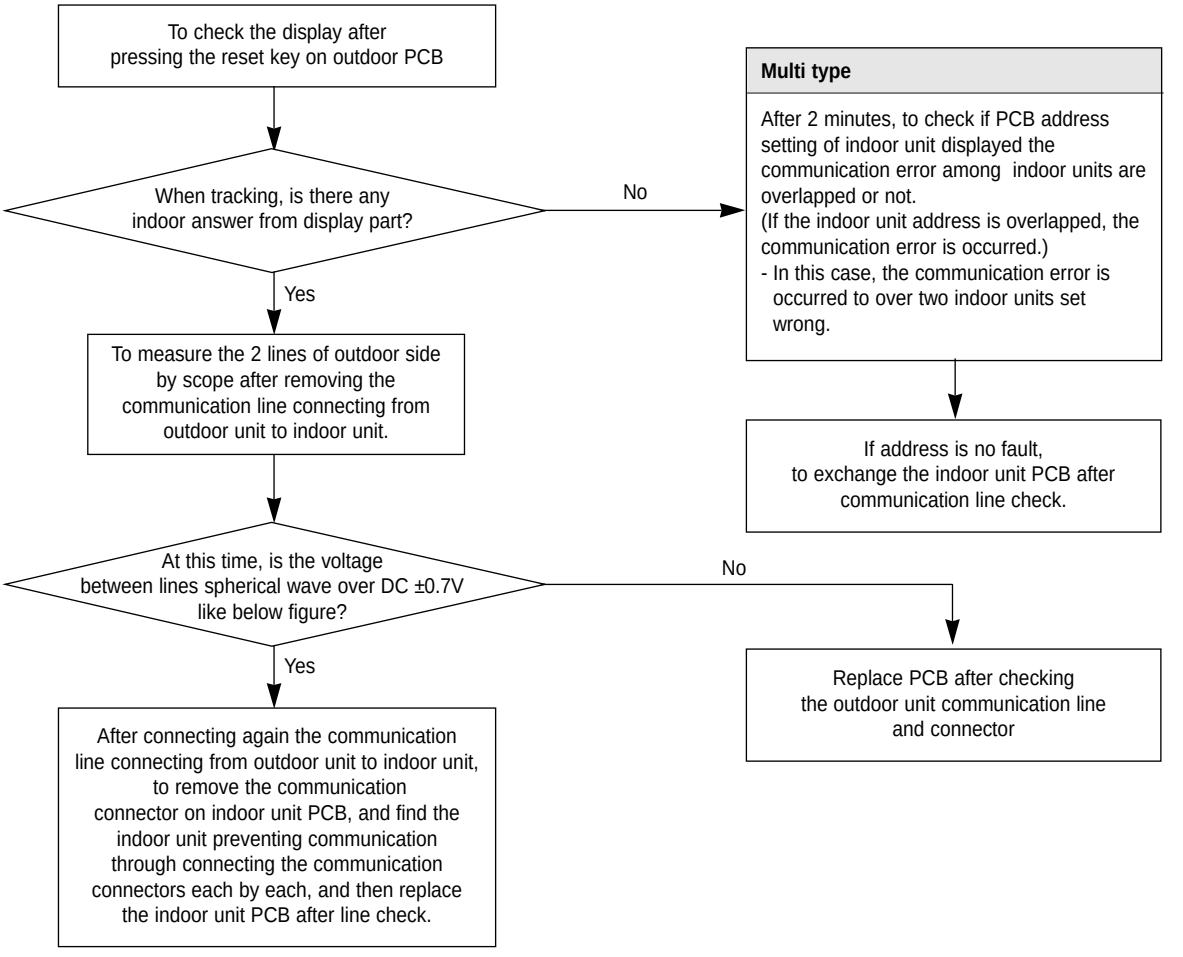
Outdoor unit display	**Er → t3 (Outdoor discharge temp. sensor OPEN/SHORT error)**
Indoor unit display	◑ (Operation) × (Timer) ◑ (Airflow) × (Filter)
How to determine	Disconnection and short of outdoor discharger temp. sensor
Reason of error	Disconnection or leak of Applied sensor

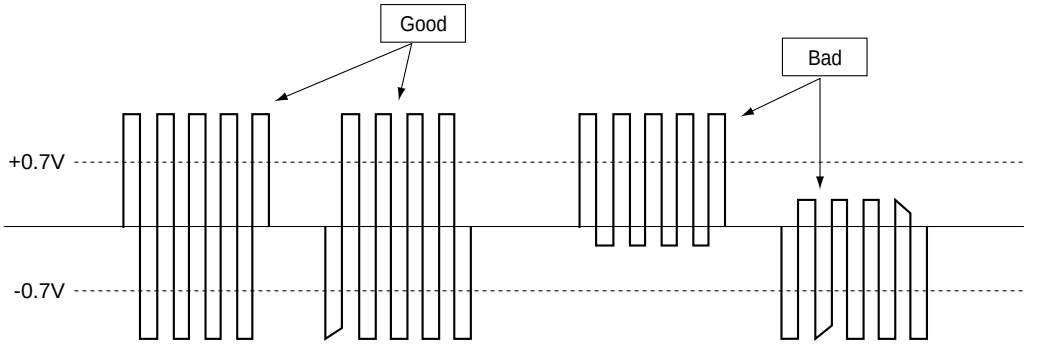

Is not separated the outdoor discharge temp. sensor connector from PCB?(CN42)
No
Reoperation after connect to connector PCB
Yes
To measure the resistance value between two terminals after separating the outdoor discharge temp. sensor connector from PCB
Yes
At this time, Is largely deviate the resistance value from side table value?
Yes
Outdoor heat exchanger temp. is defective(replace)
No
Check the out temp. sensor is normal or not by use of out data display part → Check the temp. data is normal or not after pressing K4 1 times. At this time, is occurred the difference between the out temp. and data?
No
PCB and sensor are normal. To perform the test operation by use of K2
Yes
Reoperation after PCB replacement

Temp. (˚C)	Resistance (kΩ)
130	8.9
120	11.2
100	18.5
80	32
60	59
25	200
20	242
10	362
0	553

8-4-4 Communication error during the operation

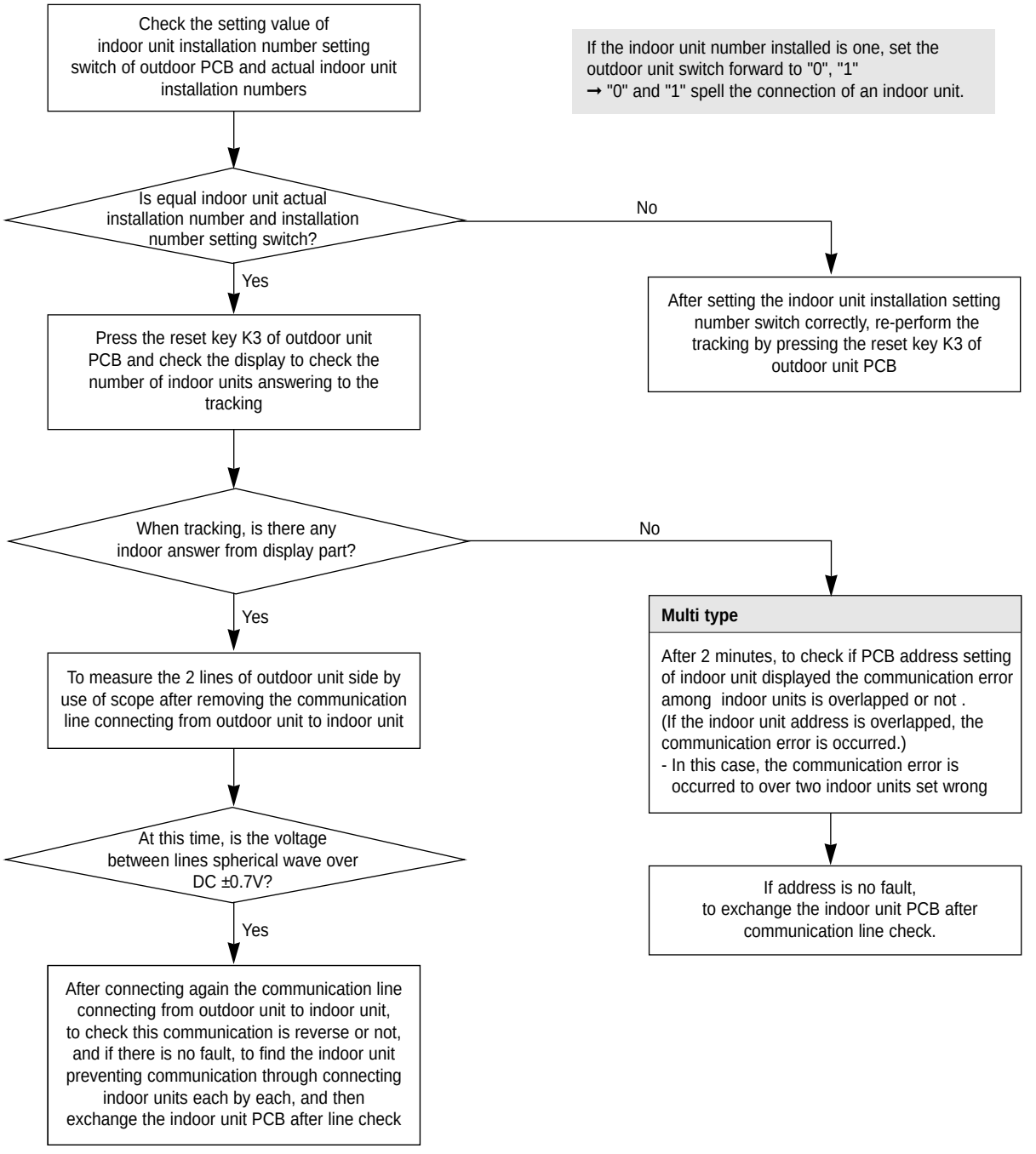
Outdoor unit display	**Er → E1 (Communication error during the operation)**
Indoor unit display	× (Operation) ◑ (Timer) ◑ (Airflow) × (Filter)
How to determine	Disconnection and short of communication lines
Reason of error	Communication error between the indoor unit and outdoor unit.


To check the display after pressing the reset key on outdoor PCB
When tracking, is there any indoor answer from display part?
No
Yes
Multi type
After 2 minutes, to check if PCB address setting of indoor unit displayed the communication error among indoor units are overlapped or not.
(If the indoor unit address is overlapped, the communication error is occurred.)
- In this case, the communication error is occurred to over two indoor units set wrong.
If address is no fault, to exchange the indoor unit PCB after communication line check.
To measure the 2 lines of outdoor side by scope after removing the communication line connecting from outdoor unit to indoor unit.
At this time, is the voltage between lines spherical wave over DC ±0.7V like below figure?
No
Yes
Replace PCB after checking the outdoor unit communication line and connector
After connecting again the communication line connecting from outdoor unit to indoor unit, to remove the communication connector on indoor unit PCB, and find the indoor unit preventing communication through connecting the communication connectors each by each, and then replace the indoor unit PCB after line check.



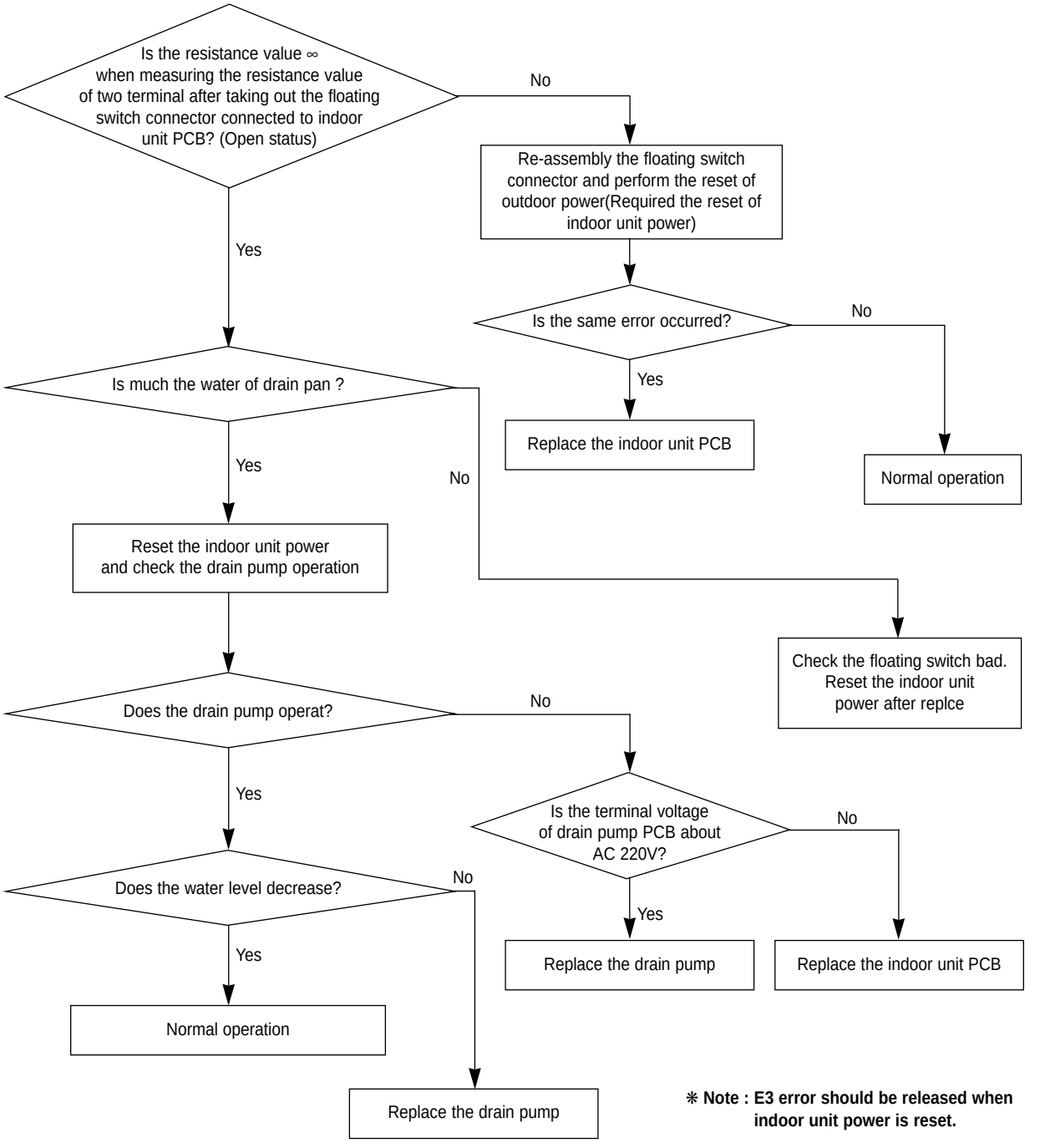
8-4-5 Communication error between indoor and outdoor after initial power input.

Outdoor unit display	**Er → E2 (Tracking error)**
Indoor unit display	× (Operation) ◑ (Timer) ◑ (Airflow) × (Filter)
How to determine	Mismatching the communicating indoor unit and setting switch indoor numbers When outdoor tracking
Reason of error	Communication error between the indoor unit and outdoor unit, and installation number switch setting miss


Check the setting value of indoor unit installation number setting switch of outdoor PCB and actual indoor unit installation numbers
If the indoor unit number installed is one, set the outdoor unit switch forward to "0", "1"
→ "0" and "1" spell the connection of an indoor unit.
Is equal indoor unit actual installation number and installation number setting switch?
No
Yes
After setting the indoor unit installation setting number switch correctly, re-perform the tracking by pressing the reset key K3 of outdoor unit PCB
Press the reset key K3 of outdoor unit PCB and check the display to check the number of indoor units answering to the tracking
When tracking, is there any indoor answer from display part?
No
Yes
Multi type
After 2 minutes, to check if PCB address setting of indoor unit displayed the communication error among indoor units is overlapped or not .
(If the indoor unit address is overlapped, the communication error is occurred.)
- In this case, the communication error is occurred to over two indoor units set wrong
To measure the 2 lines of outdoor unit side by use of scope after removing the communication line connecting from outdoor unit to indoor unit
At this time, is the voltage between lines spherical wave over DC ±0.7V?
Yes
If address is no fault, to exchange the indoor unit PCB after communication line check.
After connecting again the communication line connecting from outdoor unit to indoor unit, to check this communication is reverse or not, and if there is no fault, to find the indoor unit preventing communication through connecting indoor units each by each, and then exchange the indoor unit PCB after line check

8-4-6 Indoor float switching error

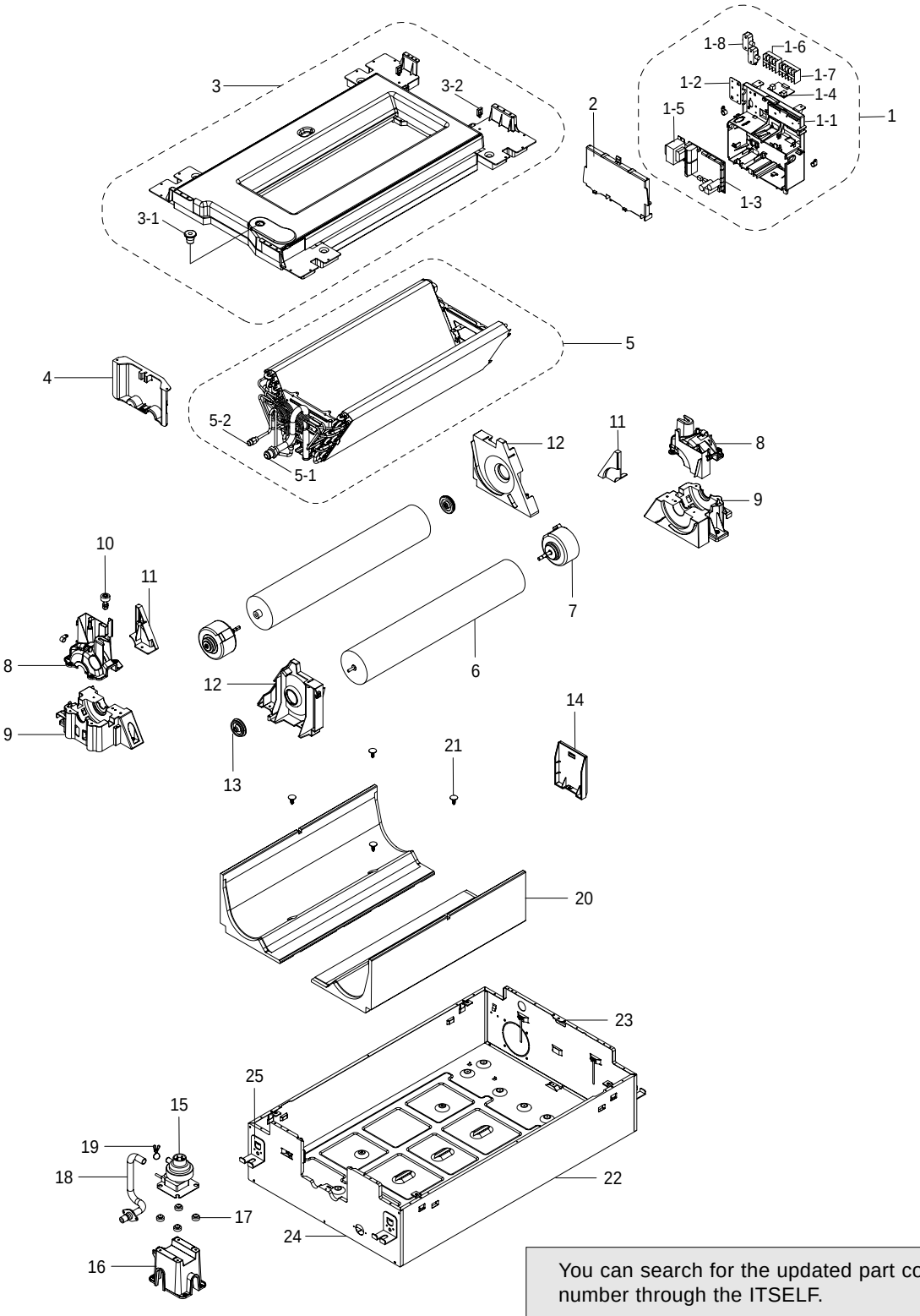
Outdoor unit display	**Er → E3 (Indoor float switching error)**
Indoor unit display	× (Operation) × (Timer) ◑ (Airflow) ◑ (Filter)
How to determine	The status continues over 1 minute that indoor unit float switch is opened.
Reason of error	The rising of water level of drain pan due to the disorder of indoor unit drain pump, the badness of detection sensor


Is the resistance value ∞ when measuring the resistance value of two terminal after taking out the floating switch connector connected to indoor unit PCB? (Open status)
No
Re-assembly the floating switch connector and perform the reset of outdoor power(Required the reset of indoor unit power)
Yes
Is the same error occurred?
No
Yes
Replace the indoor unit PCB
Normal operation
Is much the water of drain pan ?
Yes
No
Reset the indoor unit power and check the drain pump operation
Check the floating switch bad. Reset the indoor unit power after replce
Does the drain pump operat?
No
Yes
Is the terminal voltage of drain pump PCB about AC 220V?
No
Yes
Does the water level decrease?
No
Yes
Replace the drain pump
Replace the indoor unit PCB
Normal operation
Replace the drain pump
※ Note : E3 error should be released when indoor unit power is reset.

MEMO

9. Exploded Views and Parts List

9-1 Indoor Unit



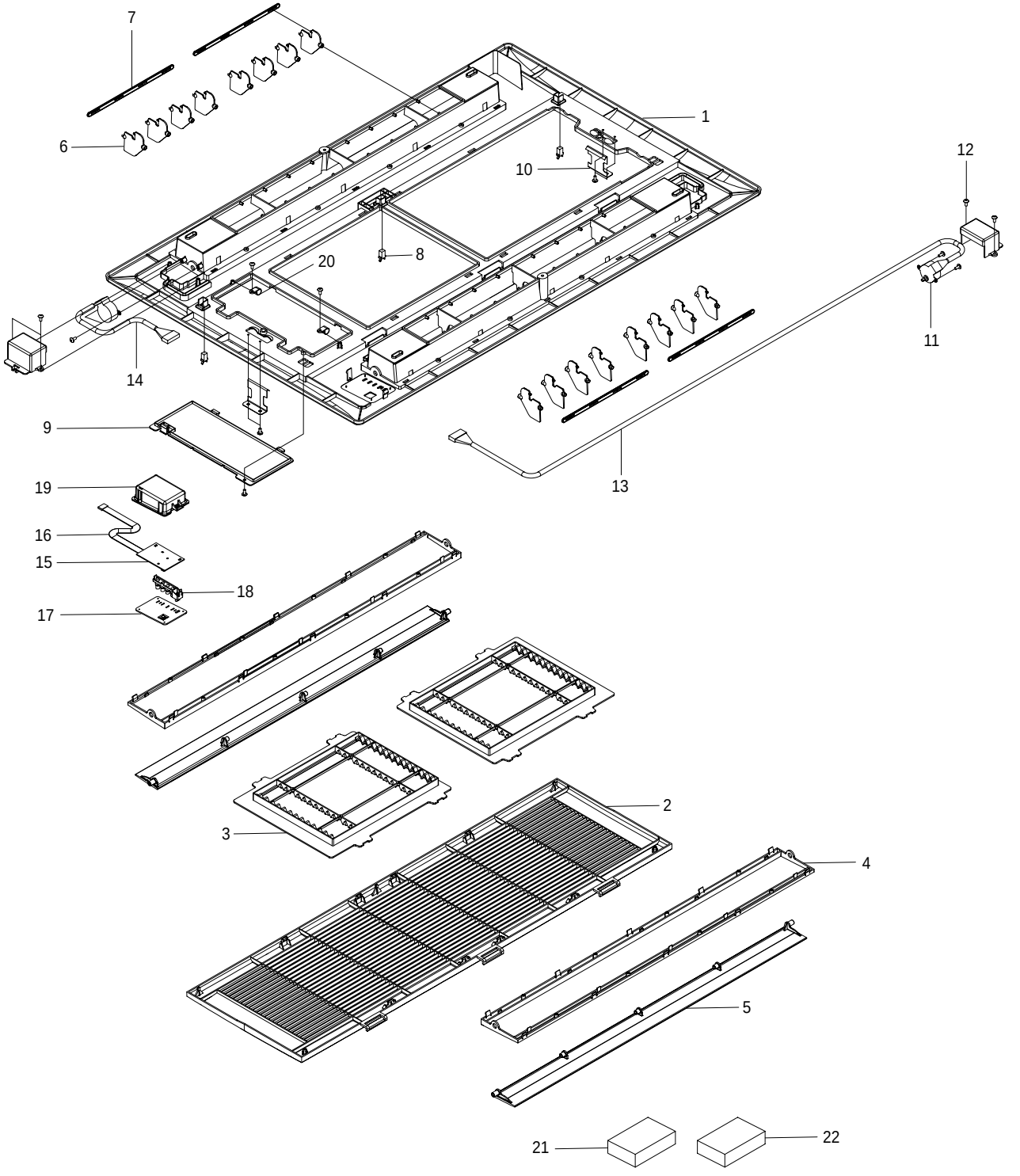
You can search for the updated part code number through the ITSELF.

URL : http://itself.sec.samsung.co.kr

■ **Parts List**

No.	Code No.	Description	Specification	Q'TY	
				GH052EAM	GH070EAM
1	DB93-01811A	ASS'Y CONTROL BOX IN	ASS'Y	1	1
1-1	DB61-01482A	CASE CONTROL	PS(V0), BLK	1	1
1-2	DB61-01236A	BASE TERMINAL	SGCC-M	1	1
1-3	DB93-01480A	ASS'Y MAIN PCB	ASS'Y PCB	1	1
1-4	DB93-01481A	SUB PCB	PCB	1	1
1-5	DB26-10065B	TRANS POWER		1	1
1-6	DB93-01783A	ASS'Y TERMINAL BLOCK 4P	DAF 4P	1	1
1-7	DB93-01784A	ASS'Y TERMINAL BLOCK 6P	DAF S6P	1	1
1-8	DB61-00250A	CLAMP WIRE	NY	2	2
2	DB63-00779A	COVER CONTROL	HIPS	1	1
3	DB91-00232A	ASS'Y DRAIN PAN	ASS'Y DRAIN	1	1
3-1	DB63-00062A	RUBBER DRAIN CAP	NBR	1	1
3-2	DB71-50025A	WIRE HOLDER	NY	1	1
4	DB63-00672A	COVER SIDE LF	PP(INCOMBUSTIBLE), BLK	1	1
5	DB96-02754A	ASS'Y EVAP	FP 1.5 SLIT 3x10	-	1
	DB96-03496A	ASS'Y EVAP	FP 1.3 SLIT 2x10	1	-
5-1	DB96-02753A	ASS'Y TUBE COLLECTOR	12.7ø	-	1
	DB96-03325A	ASS'Y TUBE COLLECTOR	9.52ø	1	-
5-2	DB96-02752A	ASS'Y INLET PART	6.35ø CAPI 2.0ø	-	1
	DB96-03324A	ASS'Y INLET PART	6.35ø CAPI 2.0ø	1	-
6	DB94-00040S	ASS'Y C-F-FAN	ø95 8 ranks, AS+G/F 20%	2	2
7	DB31-00241A	MOTOR ASSY	PFS040AVEB	2	2
8	DB90-01182A	ASS'Y COVER MOTOR	HIPS, INSU	2	2
9	DB90-01184A	ASS'Y CASE MOTOR	HIPS, INSU	2	2
10	DB95-00131F	ASS'Y SENSOR FLOAT		2	2
11	DB90-01183A	ASS'Y COVER EVAP GUIDE	HIPS, INSU	2	2
12	DB90-01185A	ASS'Y CASE FAN SIDE SUB	HIPS, INSU	2	2
13	DB94-00066A	ASS'Y BEARING	BEARING	2	2
14	DB61-01475A	GUIDE CONTROL	HIPS	1	1
15	DB31-00207A	DRAIN PUMP	KS1003SAC	1	1
16	DB61-01293A	HOLDER DRAIN PUMP	HIPS	1	1
17	DB73-00022B	RUBBER DRAIN PUMP	HIPS(HB), BLK	4	4
18	DB94-00371A	ASS'Y DRAIN SOCKET	ASS'Y	1	1
19	DB69-00137A	BAND RING	STS304	1	1
20	DB69-00695A	CUSHION BODY	EPS(GRY)	2	2
21	DB61-01468A	CLIP BRUSH	EPS(GRY)	4	4
22	DB64-00778A	CABINET BASE	SGCC-M 0.7T	1	1
23	DB64-00781A	CABI SIDE RH	SGCC-M 0.7T	1	1
24	DB64-00780A	CABI SIDE LF	SGCC-M 0.7T	1	1
25	DB61-00712A	HOLDER CABI SIDE	SGCC-M 1.0T	4	4

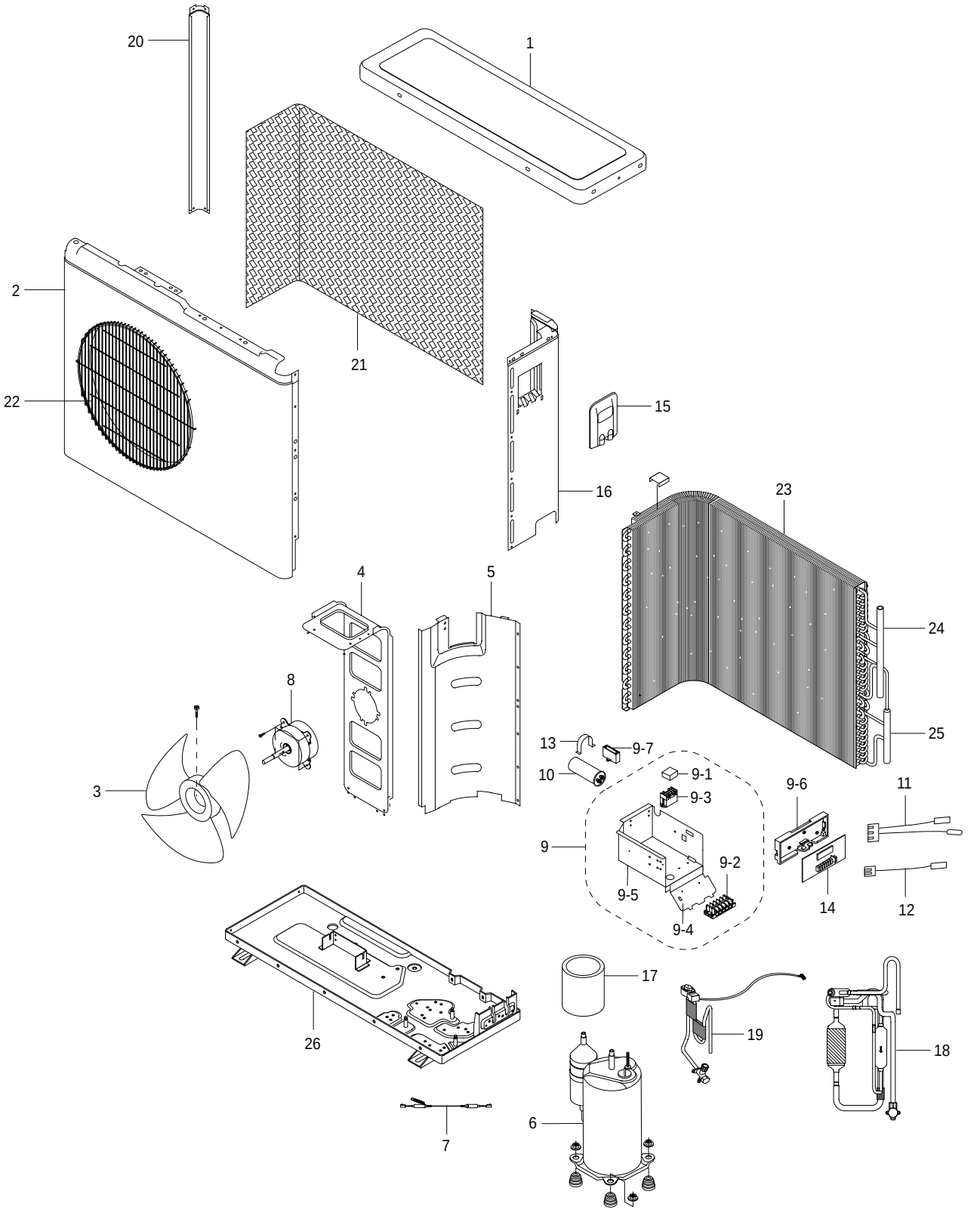
9-2 Panel



■ **Parts List**

No.	Code No.	Description	Specification	Q'TY		
				PG103M	PG103M1	PG103M2
1	DB64-00777A	PANEL FRONT	ABS	1	1	1
2	DB64-00775A	GRILLE FRONT	ABS	1	1	1
3	DB64-00774A	FILTER INLET AIR	ASS'Y	2	2	2
4	DB61-01297A	CASE OUTLET AIR	HIPS	2	2	2
5	DB66-00415A	BLADE H	HIPS	2	2	2
6	DB66-00402A	BLADE V	PP	16	16	16
7	DB66-00416A	LINK BLADE V	PP	4	4	4
8	DB66-00755A	LATCH DC	ASS'Y	3	3	3
9	DB63-00676A	COVER PANEL	HIPS	1	1	1
10	DB70-00031A	PLATE HANGER	STS304	2	2	2
11	DB31-10153D	MOTOR STEP	ASS'Y	2	2	2
12	DB61-00535A	HOLDER MOTOR	HIPS V0 BLK	2	2	2
13	DB39-00874C	C/W MOTOR STEP LONG	UL1007	1	1	1
14	DB39-00874B	C/W MOTOR STEP SHORT	UL1007	1	1	1
15	DB93-01666A	PCB DISPLAY		1	1	1
16	DB39-00875A	C/W DISPLAY	UL1007	1	1	1
17	DB64-00745A	INLAY WINDOW	PC	1	1	1
18	DB64-00746A	INLAY BUTTON	ABS	1	1	1
19	DB61-01238A	CASE LED PCB	ABS	1	1	1
20	-	CABLE CLAMP	4N	2	2	2
21	DB97-00871D	ASS'Y WIRED REMOCON	WIRED	-	1	-
22	DB97-00387F	ASS'Y WIRELESS REMOCON	WIRELESS	-	-	1

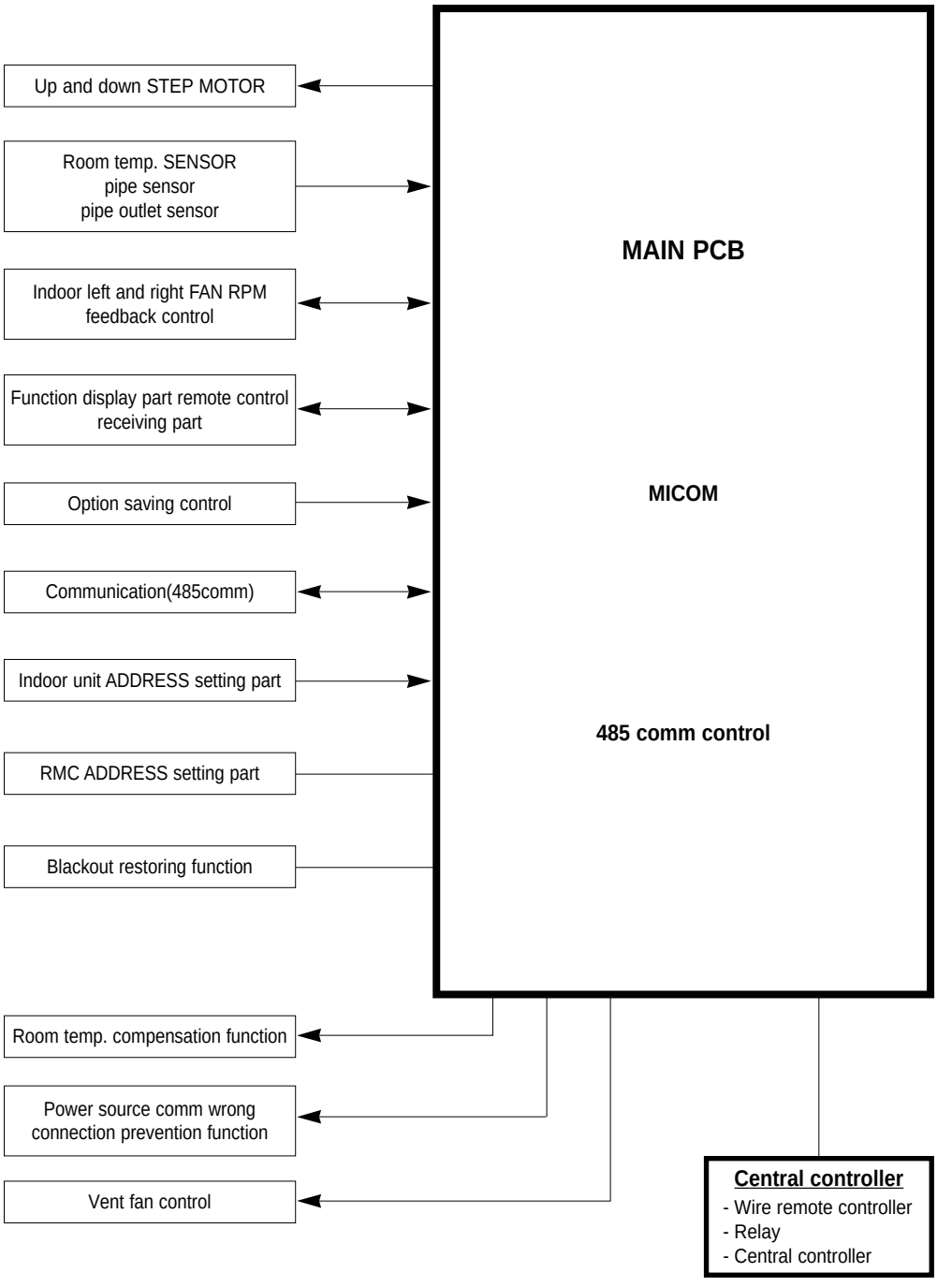
9-3 Outdoor Unit



■ **Parts List**

No.	Code No.	Description	Specification	Q'TY	
				UH052EAMT	UH070EAMT
1	DB90-01363A	ASS'Y-COVER TOP	ASS'Y	1	1
2	DB90-01388A	ASS'Y CABINET-FRONT	ASS'Y	1	1
3	DB67-00140A	FAN-PROPELLER	AS+GF20%,OD460,3BLADE	1	1
4	DB61-01167A	BRACKET-MOTOR	SGCC-M,T1.6	1	1
5	DB90-00940B	ASS'Y-PARTITION	ASS'Y	1	1
6	DB95-00455A	ASS'Y COMP	SIAM,NN29VACMT	-	1
	DB95-00454A	ASS'Y COMP	SIAM,NN21VBAMT	1	-
7	DB95-30013T	ASS'Y HEATER COMP	40W	1	1
8	DB31-00216A	MOTOR-FAN	OSEM-886SRC(S509)	-	1
	DB31-00027G	MOTOR-FAN	OSEM-906SRC(S507)	1	-
9	DB93-02410A	ASS'Y CONTROL OUT	ASS'Y	-	1
	DB93-02410B	ASS'Y CONTROL OUT	ASS'Y	1	-
9-1	DB26-10070A	TRANS-POWER	AC230V,DC17V	1	1
9-2	DB65-00112A	TERMINAL BLOCK-6P	35A 4P,25A 2P	1	1
9-3	3501-001204	RELAY POWER	MUF20CF,2A	1	1
9-4	DB61-30625A	BRACKET-TERMINAL	SGCC-M	1	1
9-5	DB93-40264E	ASS'Y CONTROL BOX OUT	ASS'Y	1	1
9-6	DB61-00152A	CASE-PCB-OUT	T2.5,ABS,BLK	1	1
9-7	2301-001369	C-FILM	3uF/450VAC	1	1
10	2501-001236	C-OIL	30uF/450VAC	-	1
	2501-001235	C-OIL	25uF/450VAC	-	1
	2501-001240	C-OIL	50uF/450VAC	1	-
11	DB32-00021F	THERMISTOR	AWG22,L470,L550	1	1
12	DB32-00071C	THERMISTOR	AWG22,L600	1	1
13	DB61-01685A	BRACKET-CAPACITOR	SGCC-M	-	1
	DB69-60008A	BAND-CAPACITOR	SGCC-M	1	-
14	DB93-01855K	ASS'Y PCB MAIN	CEILING OUTDOOR PCB	1	-
	DB93-01855J	ASS'Y PCB MAIN	CEILING OUTDOOR PCB	-	1
15	DB90-40176D	ASS'Y COVER CONTROL	ASS'Y	1	1
16	DB90-01189B	ASS'Y-ASS'Y CABI SIDE RH	ASS'Y	1	1
17	DB62-01471A	INSULATION-CLOTH COMP	UH070EAMT	-	1
	DB62-02295A	INSULATION-CLOTH COMP	UH052EAMT	1	-
18	DB96-02876A	ASS'Y 4WAY VALVE	ASS'Y	-	1
	DB96-02877A	ASS'Y 4WAY VALVE	ASS'Y	1	-
19	DB96-02896A	ASS'Y EEV VALVE	ASS'Y	-	1
	DB96-02896B	ASS'Y EEV VALVE	ASS'Y	1	-
20	DB63-00613A	GUARD-COND	SECC-P,T1.6	1	1
21	DB61-01221A	GUIDE-SCREEN	P.E.H 100%,T2.5,1015x615,BLK	1	1
22	DB63-00320A	GUARD-FAN	HSWR,460	1	1
23	DB96-02849A	ASS'Y COND UNIT	UH070EAMT,UH052EAMT	1	1
24	DB96-02936A	ASS'Y COLLECTOR IN	ASS'Y	1	1
25	DB96-02937A	ASS'Y COLLECTOR OUT	ASS'Y	1	1
26	DB90-01291A	ASS'Y CABINET BASE OUT	ASS'Y	1	1

10. Block Diagram

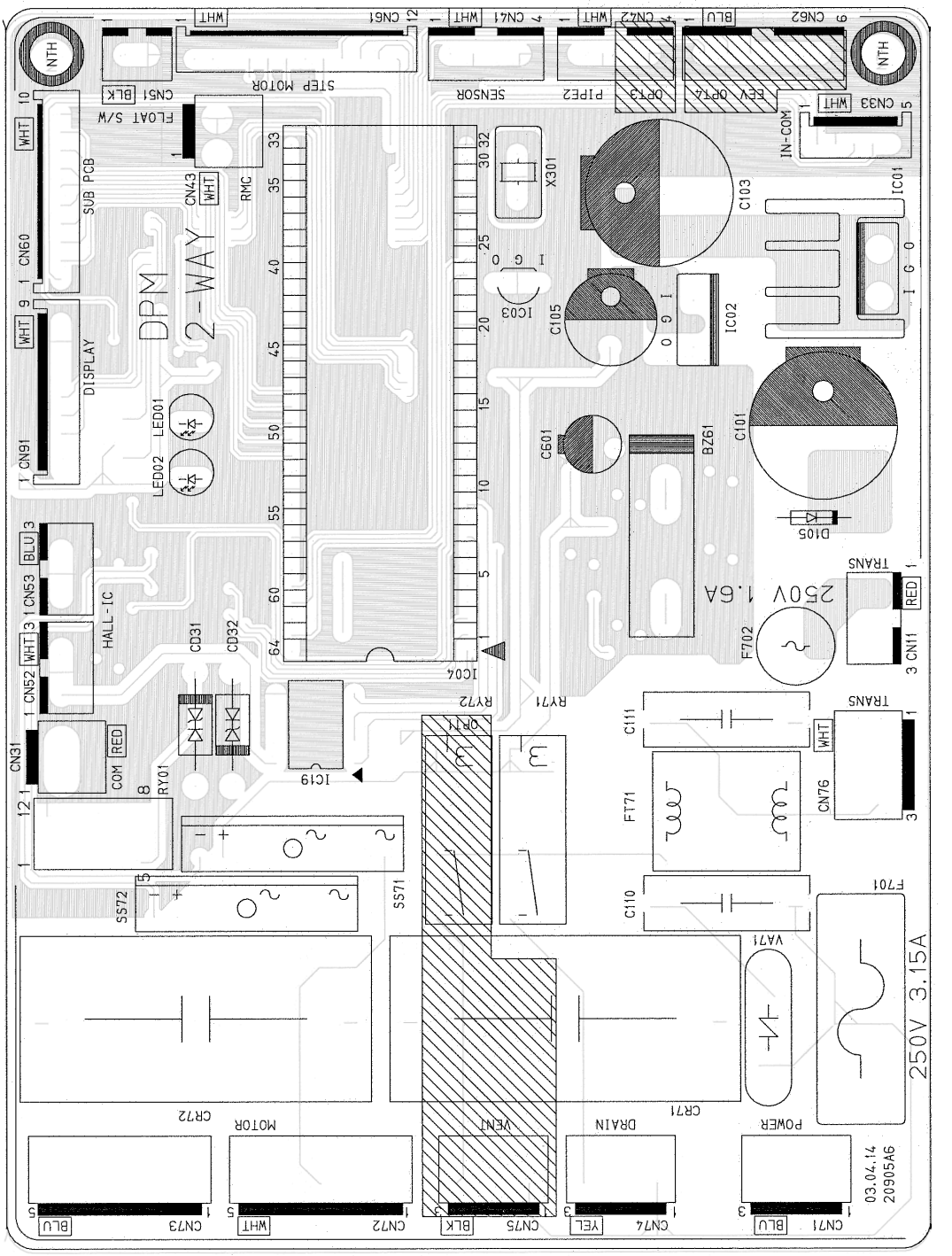


- 485 comm applied, room temp. compensation
- EEPROM option saving and blackout restoring function
- Left and right FAN MOTOR phase control
- Power-comm line misconnection prevention function
- Cost saving related sub-option separation between indoor unit communication part
- Option part sub-development according to the SVC structure

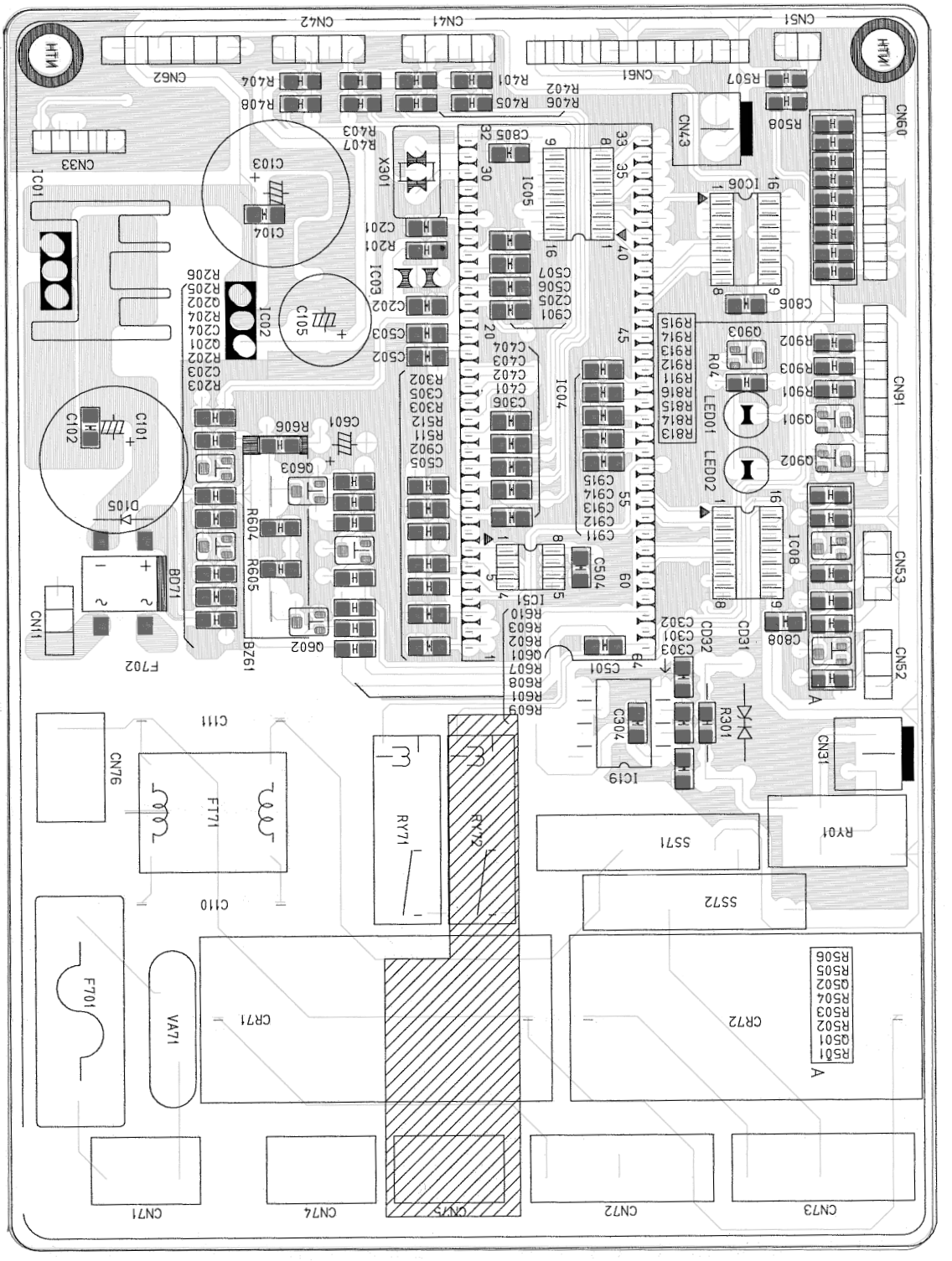
11. PCB Diagram

11-1 Indoor Unit(Code No : DB93-01480A)

■ **TOP**



■ BOTTOM


CN42
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CN11
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CN75
CN72
CN73
IC01
IC02
IC03
IC04
IC05
IC06
IC08
IC19
IC51
X301
C103
C104
C105
C101
C102
C110
C111
R604
R605
R606
Q603
Q602
BZ61
BD71
D105
F702
F701
FT71
RY71
RY72
VA71
CR71
CR72
SS71
SS72
R301
R04
LED01
LED02
Q903
Q902
Q901
C304
C504
CD31
CD32

■ Parts List

Location No.	Description	Specification	Q'TY
BD71	DIODE-BRIDGE	DF06S,600V,1A,SMD-4,TP	1
BZ61	BUZZER-PIEZO	70dB,3V,-,2KHz,BK	1
C101	C-AL	2200uF,20%,35V,GP,TP,16x25,7.5	1
C102	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C103	C-AL	2200uF,20%,25V,GP,TP,16x25,7.5	1
C104	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C105	C-AL	470uF,20%,25V,GP,TP,10x12.5mm	1
C110	C-FILM,MPPF	100nF,10%,275V,BK,18x6x12,15	1
C111	C-FILM,MPPF	100nF,10%,275V,BK,18x6x12,15	1
C201	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C202	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C203	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C204	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	1
C205	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	1
C301	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	1
C302	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C303	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C304	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C305	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C306	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C401	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C402	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C403	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C404	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C501	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C502	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C503	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C504	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C505	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C506	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	1
C507	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	1
C601	C-AL	47uF,20%,50V,GP,TP,6.3x11,2.5	1
C805	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C806	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C808	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C901	C-CER,CHIP	1nF,10%,50V,X7R,TP,2012,-	1
C902	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	1
C911	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	1
C912	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	1
C913	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	1
C914	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	1
C915	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	1
CD31	DIODE-TVS	SAC5.0,7.6/-/-V,500W,DO-15	1
CD32	DIODE-TVS	SAC5.0,7.6/-/-V,500W,DO-15	1
CN11	CONNECTOR-HEADER	BOX,3P,1R,2.5mm,STRAIGHT,SN	1
CN31	CONNECTOR-HEADER	1WALL,2P,1R,3.96mm,STRAIGHT,SN	1
CN33	CONNECTOR-HEADER	BOX,5P,1R,2mm,STRAIGHT,SN	1
CN41	CONNECTOR-HEADER	BOX,4P,1R,2.5mm,STRAIGHT,SN	1
CN42	CONNECTOR-HEADER	BOX,2P,1R,2.5mm,STRAIGHT,SN	1

■ **Parts List(cont.)**

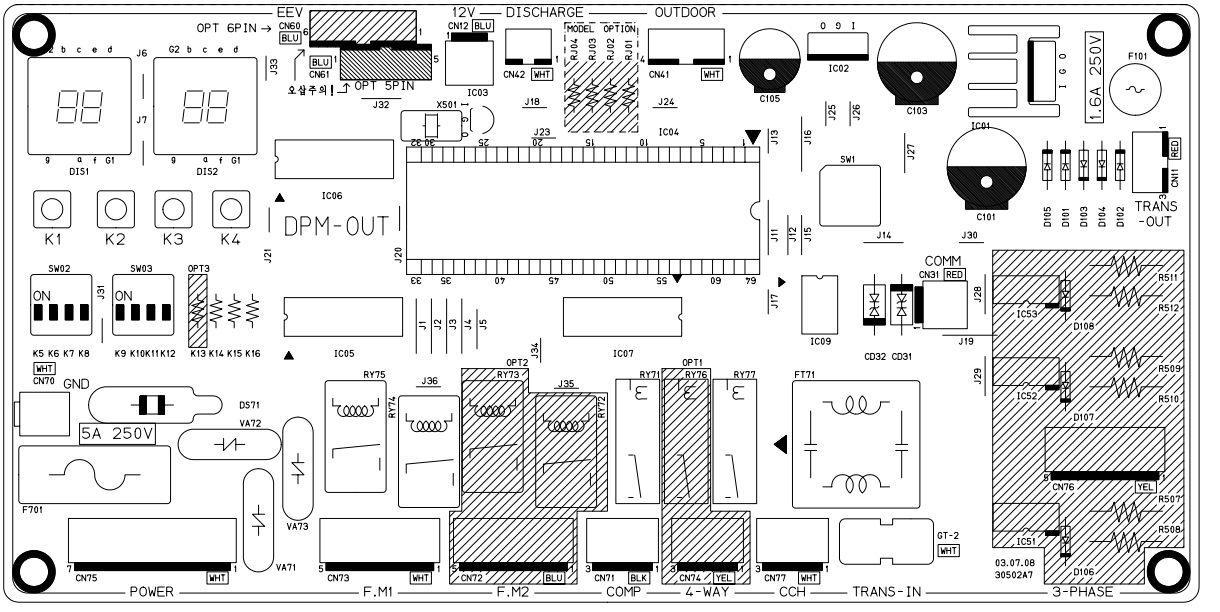
Location No.	Description	Specification	Q'TY
CN43	CONNECTOR-HEADER	1WALL,2P,1R,3.96mm,STRAIGHT,SN	1
CN51	CONNECTOR-HEADER	BOX,2P,1R,2.5mm,STRAIGHT,SN	1
CN52	CONNECTOR-HEADER	BOX,3P,1R,2.5mm,STRAIGHT,SN	1
CN53	CONNECTOR-HEADER	BOX,3P,1R,2.5mm,STRAIGHT,SN	1
CN60	CONNECTOR-HEADER	BOX,10P,1R,2mm,STRAIGHT,SN,NTR	1
CN61	CONNECTOR-HEADER	BOX,12P,1R,2mm,STRAIGHT,SN	1
CN71	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,BL	1
CN72	CONNECTOR-HEADER	1WALL,3P,1R,7.92mm,STRAIGHT,SN,WH	1
CN73	CONNECTOR-HEADER	1WALL,3P,1R,7.92mm,STRAIGHT,SN,BL	1
CN74	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,YE	1
CN75	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,BL	1
CN76	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,WH	1
CN91	CONNECTOR-HEADER	BOX,9P,1R,2mm,STRAIGHT,SN	1
CR71	C-FILM,MPPF	1.2uF,10%,450Vac,BK,38x18x30,3	1
CR72	C-FILM,MPPF	1.2uF,10%,450Vac,BK,38x18x30,3	1
D105	DIODE-RECTIFIER	1N4007,1KV,1A,DO-41,TP	1
F701	FUSE-CARTRIDGE	250V,3.15A,TIME-LAG,GLASS,5x20mm	1
F702	FUSE	250V,1.6A,TIME-LAG,PLASTIC,8.4x7.6mm	1
FT71	LS404190M	AS-S660,19MH,+50,-30%,-,300Mohm,2A,-,-,-	1
IC01	IC-POSI.FIXED REG.	7812,TO-220,3P,-,PLASTIC,11.5/1	1
IC02	IC-POSI.FIXED REG.	7805,TO-220,3P,-,PLASTIC,4.8/5	1
IC03	IC-VOLTAGE COMP.	7533,TO-92,3P,-,SINGLE,-,-,PLASTIC	1
IC04	IC MICOM	MB89538AP-101,MB89538AP-101,64P,+5V,10MHZ	1
IC05	TR-ARRAY	2003,NPN,7,1W,SOP-16,ST,1000	1
IC06	TR-ARRAY	2003,NPN,7,1W,SOP-16,ST,1000	1
IC08	TR-ARRAY	2003,NPN,7,1W,SOP-16,ST,1000	1
IC19	IC-BUS TRANSCEIVER	485,DIP,8P,300MIL,SINGLE,ST,PLASTIC	1
IC51	IC-EEPROM	93LC56,128x16,SOP,8P,5x4mm,2.5/6.0V,-40	1
LED01	LED	TR,LED,1PCS,130-260%	1
LED02	LED	ROUND,YEL,5mm,585nm	1
Q201	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1	1
Q202	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1	1
Q501	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1	1
Q502	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1	1
Q601	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1	1
Q602	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1	1
Q603	TR-SMALL SIGNAL	MMST2907A,PNP,200mW,SOT-23,TP,100	1
Q901	TR-DIGITAL	DTA114EKA,PNP,200MW,10K/10K,SOT-23,TP	1
Q902	TR-DIGITAL	DTA114EKA,PNP,200MW,10K/10K,SOT-23,TP	1
Q903	TR-DIGITAL	DTA114EKA,PNP,200MW,10K/10K,SOT-23,TP	1
R04	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R201	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R202	R-CHIP	3.3Kohm,5%,1/8W,TP,2012	1
R203	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R204	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R205	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R206	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R301	R-CHIP	120ohm,5%,1/8W,TP,2012	1
R302	R-CHIP	10Kohm,5%,1/8W,TP,2012	1

■ **Parts List(cont.)**

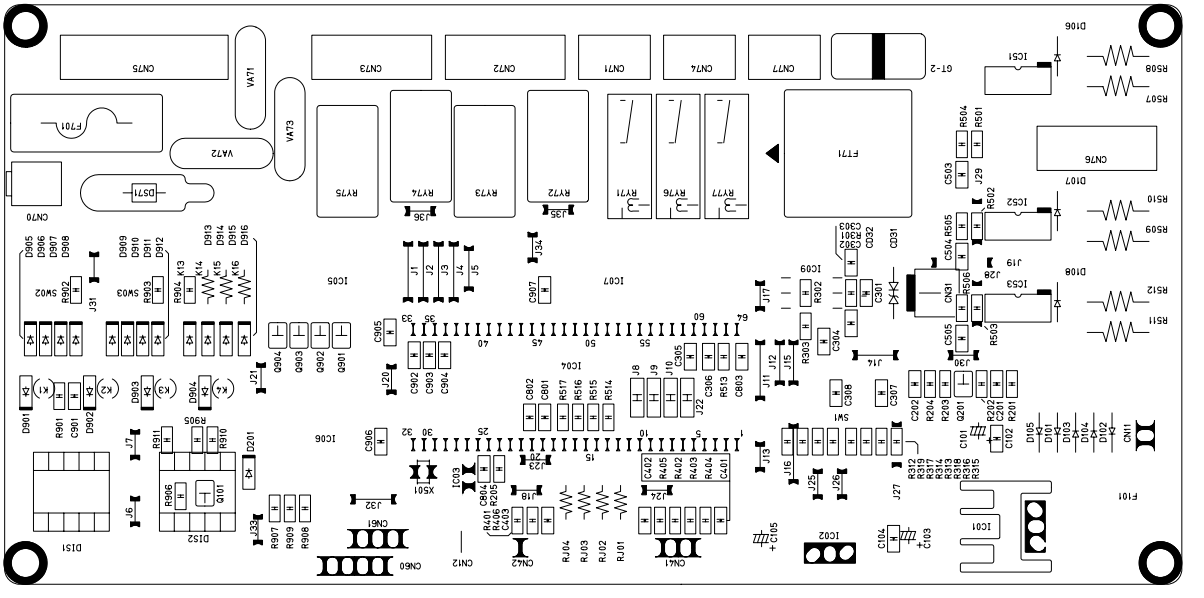
Location No.	Description	Specification	Q'TY
R303	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R401	R-CHIP	6.8Kohm,1%,1/8W,TP,2012	1
R402	R-CHIP	6.8Kohm,1%,1/8W,TP,2012	1
R403	R-CHIP	6.8Kohm,1%,1/8W,TP,2012	1
R404	R-CHIP	6.8Kohm,1%,1/8W,TP,2012	1
R405	R-CHIP	330ohm,5%,1/8W,TP,2012	1
R406	R-CHIP	330ohm,5%,1/8W,TP,2012	1
R407	R-CHIP	330ohm,5%,1/8W,TP,2012	1
R408	R-CHIP	330ohm,5%,1/8W,TP,2012	1
R501	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R502	R-CHIP	6.8Kohm,5%,1/8W,TP,2012	1
R503	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R504	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R505	R-CHIP	6.8Kohm,5%,1/8W,TP,2012	1
R506	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R507	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R508	R-CHIP	330ohm,5%,1/8W,TP,2012	1
R511	R-CHIP	47Kohm,5%,1/8W,TP,2012	1
R512	R-CHIP	47Kohm,5%,1/8W,TP,2012	1
R601	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R602	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R603	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R604	R-CHIP	470ohm,5%,1/8W,TP,2012	1
R605	R-CHIP	470ohm,5%,1/8W,TP,2012	1
R606	R-CHIP	560ohm,5%,1/8W,TP,2012	1
R607	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R608	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R609	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R610	R-CHIP	3.3Kohm,5%,1/8W,TP,2012	1
R813	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R814	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R815	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R816	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R901	R-CHIP	330ohm,5%,1/8W,TP,2012	1
R902	R-CHIP	1Kohm,5%,1/8W,TP,2012	1
R903	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R911	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R912	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R913	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R914	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
R915	R-CHIP	10Kohm,5%,1/8W,TP,2012	1
RY01	RELAY-MINIATURE	12V,-,11.7MA,DPDT,4MS,4MS	1
RY71	RELAY-MINIATURE	12VDC,200MW,3000MA,1FORMA,10MS,10M	1
RY72	RELAY-MINIATURE	12VDC,200MW,3000MA,1FORMA,10MS,10M	1
SS71	SSR	12Vdc,-,2A,1mS,1mS	1
SS72	SSR	12Vdc,-,2A,1mS,1mS	1
VA71	VARISTOR	560V,2500A,17.5x7.5mm,TP	1
X301	RESONATOR-CERAMIC	10MHz,0.5%,TP,10.0x5.0x8.0mm	1

11-2 Outdoor Unit (Code No:DB93-01855K;UH052EAMT / DB93-01855J;UH070EAMT)

■ TOP



■ BOTTOM



* The figure of PCB Pattern is common UH052EAMT and UH070EAMT.
Only part list is different from between UH052EAMT and UH070EAMT.

■ **Parts List(UH052EAMT)**

Location No.	Description	Specification	Q'TY
D201,D901~D916	DIODE-SWITCHING	RLS4148,100V,200MA,SOD-80C,TP	17
D101~D105	DIODE-RECTIFIER	1N4007,1000V,1A,DO-41,TP	5
CD31~CD32	DIODE-TVS	SAC5.0,7.6/-/-V,500W,DO-15	2
Q201	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1	1
Q901~D904	TR-DIGITAL	DTA114EKA,PNP,200MW,10K/10K,SOT-23,TP	4
Q101	TR-DIGITAL	KSR1102,NPN,200MW,10K/10K,SOT-23,TP	1
IC05~IC07	IC-DARLINGTON DRIVER	KID65003AP,DIP,16PIN,300MIL,H	3
IC09	IC-BUS TRANSCEIVER	485,DIP,8P,300MIL,SINGLE,ST,PLASTIC	1
IC03	IC-VOLTAGE COMP.	7533,TO-92,3P,-,SINGLE,-,-,PLASTIC	1
IC01	IC-POSI.FIXED REG.	7812A,TO-220,3P,-,PLASTIC,11.5	1
IC02	IC-POSI.FIXED REG.	7805,TO-220,3P,-,PLASTIC,4.8/5	1
VA72,VA73	VARISTOR	470V,4500A,17x12mm,BK	2
VA71	VARISTOR	560V,2500A,17.5x7.5mm,TP	1
RJ03	R-CARBON	12Kohm,5%,1/4W,AA,TP,2.4x6.4mm	1
K13~K16,RJ01	R-CARBON	0ohm,5%,1/4W,AA,TP,2.4x6.4mm	5
R301	R-CHIP	120ohm,5%,1/8W,TP,2012	1
R201,R302,R303	R-CHIP	10Kohm,5%,1/8W,TP,2012	20
R312~319,R513~R517			
R901~R904			
R402,R403	R-CHIP	18Kohm,1%,1/8W,TP,2012	2
R203~R205,R905~R911	R-CHIP	1Kohm,5%,1/8W,TP,2012	10
R401	R-CHIP	24Kohm,1%,1/8W,TP,2012	1
R202	R-CHIP	3.3Kohm,5%,1/8W,TP,2012	1
R404~R406	R-CHIP	330ohm,5%,1/8W,TP,2012	3
C102,C104,C201	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	20
C302~C308,C401~C403			
C801~C804,C905~C907			
C202,C301,C901~C904	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	6
C105	C-AL	470uF,20%,25V,GP,TP,10x12.5mm	1
C101,C103	C-AL	1000uF,20%,35V,GP,TP,13x25,5	2
X501	RESONATOR-CERAMIC	10MHZ,0.5%,BK,8x3x5.5mm	1
FT71	FILTER-EMI AC LINE	250V,1A,UL/CSA/TUV/SEMKO,100000	1
K1~K4	SWITCH-PUSH	125V,1A,SPDT,ON-ON,-	4
SW02,SW03	SWITCH-DIP	5V DC,100mA,SLIDE,-	2
RY71~RY77	RELAY-MINIATURE	12VDC,200MW,3000MA,1FORMA,10MS,10M	7
F701_1	FUSE-CARTRIDGE	250V,5A,FAST-ACTING,GLASS,5.2x20mm	1
F101	FUSE	250V,1.6A,TIME-LAG,PLASTIC,8.4x7.6mm	1
F701	FUSE-BLOCK	500V,-,100M	1
CN42	CONNECTOR-HEADER	BOX,2P,1R,2.5mm,STRAIGHT,SN,WHT	1
CN12	CONNECTOR-HEADER	1WALL,2P,1R,3.96mm,STRAIGHT,SN	1

■ **Parts List(UH052EAMT)(cont.)**

Location No.	Description	Specification	Q'TY
CN31	CONNECTOR-HEADER	1WALL,2P,1R,3.96mm,STRAIGHT,SN	1
CN77	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,WH	1
CN72	CONNECTOR-HEADER	1WALL,3P,1R,7.92mm,STRAIGHT,SN,BL	1
CN73	CONNECTOR-HEADER	1WALL,3P,1R,7.92mm,STRAIGHT,SN,WH	1
CN75	CONNECTOR-HEADER	1WALL,4P,1R,7.92mm,STRAIGHT,SN,WH	1
CN70	CONNECTOR-HEADER	BOX,1P,1R,6mm,STRAIGHT,NI,WHT	1
CN11	CONNECTOR-HEADER	BOX,3P,1R,2.5mm,STRAIGHT,SN	1
CN41	CONNECTOR-HEADER	BOX,4P,1R,2.5mm,STRAIGHT,SN	1
CN61	CONNECTOR-HEADER	BOX,5P,1R,2.5mm,STRAIGHT,SN	1
CN60	CONNECTOR-HEADER	BOX,6P,1R,2.5mm,STRAIGHT,SN	1
CN71	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,BL	1
CN74	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,YE	1
GT-2	CONNECTOR-TERMINAL	PIN,MALE,#18-22,2.35mm	1
DIS1	LED DISPLAY-7SEG	ELD-306GWA,-,2,14,-,15x15.5x7.2,G	1
DIS2	LED DISPLAY-7SEG	ELD-306GWA,-,2,14,-,15x15.5x7.2,G	1
IC04	IC MICOM	MB89538AP-101,MB89538AP-101,64P,+5V,10MHz	1
SW1	SWITCH-DIGITAL	PT65 103,ROTARY DIP,-,DC24V MAX,0.4	1
DS71	POSISTOR	DSA-332MA,2pF MAX,100Mohm,ASM-3	1
RJ01	R-CARBON	0ohm,1/4W,2.4x6.4mm	1
RJ02	R-CARBON	8.2Kohm,5%,1/4W,AA,TP,2.4x6.4mm	1
RJ03	R-CARBON	12Kohm,5%,1/4W,AA,TP,2.4x6.4mm	1
RJ04	R-CARBON	18Kohm,5%,1/4W,AA,TP,2.4x6.4mm	1

■ **Parts List(UH070EAMT)**

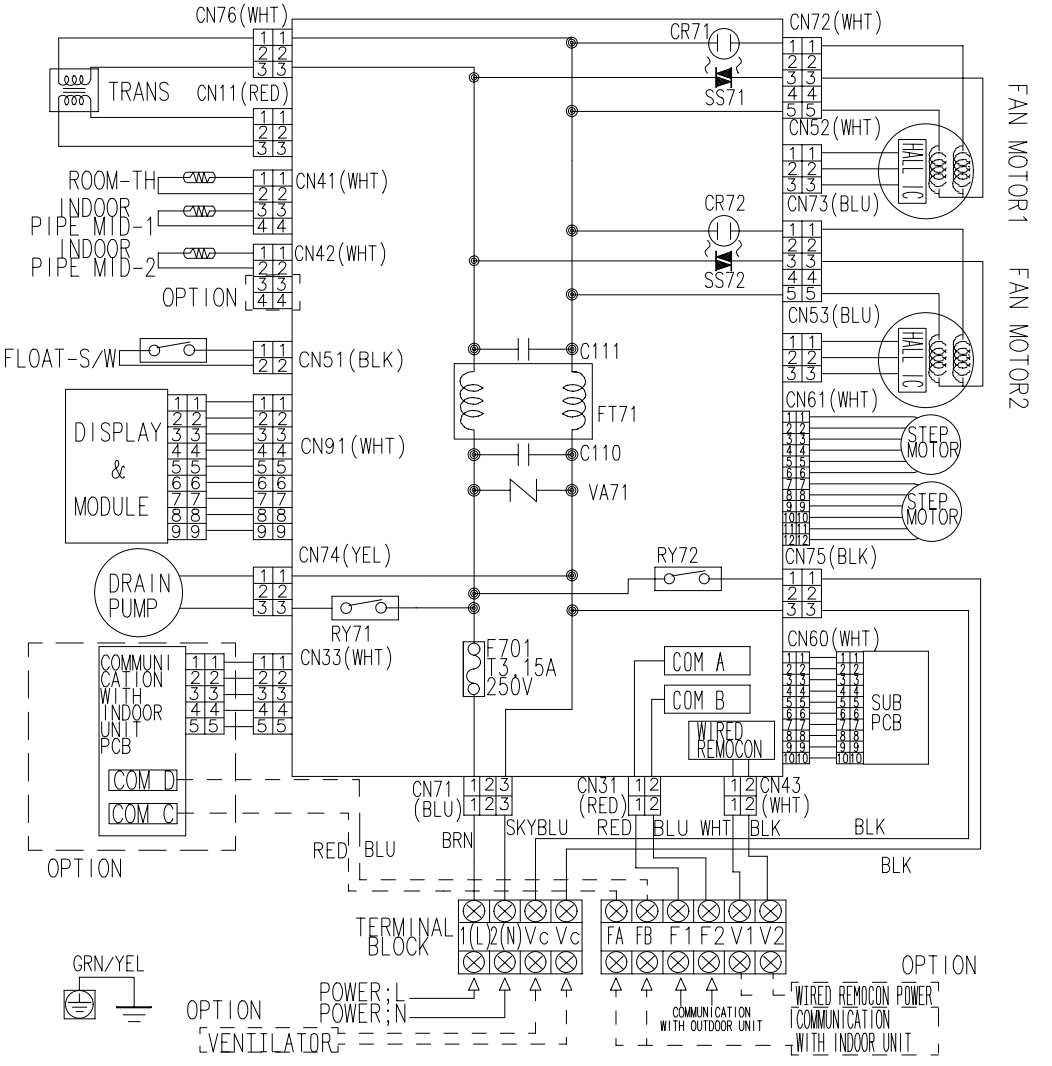
Location No.	Description	Specification	Q'TY
D201,D901~D916	DIODE-SWITCHING	RLS4148,100V,200MA,SOD-80C,TP	17
D101~D105	DIODE-RECTIFIER	1N4007,1000V,1A,DO-41,TP	5
CD31,CD32	DIODE-TVS	SAC5.0,7.6/-/-V,500W,DO-15	2
Q201	TR-SMALL SIGNAL	2SC2412K,NPN,200mW,SOT-23,TP,1	1
Q901~Q904	TR-DIGITAL	DTA114EKA,PNP,200MW,10K/10K,SOT-23,TP	4
Q101	TR-DIGITAL	KSR1102,NPN,200MW,10K/10K,SOT-23,TP	1
IC05~IC07	IC-DARLINGTON DRIVER	KID65003AP,DIP,16PIN,300MIL,H	3
IC09	IC-BUS TRANSCEIVER	485,DIP,8P,300MIL,SINGLE,ST,PLASTIC	1
IC03	IC-VOLTAGE COMP.	7533,TO-92,3P,-,SINGLE,-,-,PLASTIC	1
IC01	IC-POSI.FIXED REG.	7812A,TO-220,3P,-,PLASTIC,11.5	1
IC02	IC-POSI.FIXED REG.	7805,TO-220,3P,-,PLASTIC,4.8/5	1
VA72,VA73	VARISTOR	470V,4500A,17x12mm,BK	2
VA71	VARISTOR	560V,2500A,17.5x7.5mm,TP	1
K13~K16,RJ01	R-CARBON	0ohm,5%,1/4W,AA,TP,2.4x6.4mm	5
R301	R-CHIP	120ohm,5%,1/8W,TP,2012	1
R201,R302~R303	R-CHIP	10Kohm,5%,1/8W,TP,2012	20
R312~R319,R513~R517			
R901~R904			
R402,R403	R-CHIP	18Kohm,1%,1/8W,TP,2012	2
R203~R205,R905~R911	R-CHIP	1Kohm,5%,1/8W,TP,2012	10
R401	R-CHIP	24Kohm,1%,1/8W,TP,2012	1
R202	R-CHIP	3.3Kohm,5%,1/8W,TP,2012	1
R404~R406	R-CHIP	330ohm,5%,1/8W,TP,2012	3
C102,C104,C201	C-CER,CHIP	100nF,+80-20%,50V,Y5V,TP,2012	20
C302~C308,C401~C403			
C801~C804,C905~C907			
C202,C301,C901~C904	C-CER,CHIP	10nF,+80-20%,50V,Y5V,TP,2012	6
C105	C-AL	470uF,20%,25V,GP,TP,10x12.5mm	1
C101,C103	C-AL	1000uF,20%,35V,GP,TP,13x25,5	2
X501	RESONATOR-CERAMIC	10MHZ,0.5%,BK,8x3x5.5mm	1
FT71	FILTER-EMI AC LINE	250V,1A,UL/CSA/TUV/SEMKO,100000	1
K1~K4	SWITCH-PUSH	125V,1A,SPDT,ON-ON,-	4
SW02,SW03	SWITCH-DIP	5V DC,100mA,SLIDE,-	2
RY71,R76,R77	RELAY-MINIATURE	12VDC,200MW,3000MA,1FORMA,10MS,10M	3
RY72~RY75	RELAY-MINIATURE	12VDC,200MW,5000MA,1FORMA,10MS,5MS	4
F701_1	FUSE-CARTRIDGE	250V,5A,FAST-ACTING,GLASS,5.2x20mm	1
F101	FUSE	250V,1.6A,TIME-LAG,PLASTIC,8.4x7.6mm	1
F701	FUSE-BLOCK	500V,-,100M	1
CN42	CONNECTOR-HEADER	BOX,2P,1R,2.5mm,STRAIGHT,SN,WHT	1
CN12	CONNECTOR-HEADER	1WALL,2P,1R,3.96mm,STRAIGHT,SN	1

■ **Parts List(UH070EAMT)(cont.)**

Location No.	Description	Specification	Q'TY
CN31	CONNECTOR-HEADER	1WALL,2P,1R,3.96mm,STRAIGHT,SN	1
CN77	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,WH	1
CN72	CONNECTOR-HEADER	1WALL,3P,1R,7.92mm,STRAIGHT,SN,BL	1
CN73	CONNECTOR-HEADER	1WALL,3P,1R,7.92mm,STRAIGHT,SN,WH	1
CN75	CONNECTOR-HEADER	1WALL,4P,1R,7.92mm,STRAIGHT,SN,WH	1
CN70	CONNECTOR-HEADER	BOX,1P,1R,6mm,STRAIGHT,NI,WHT	1
CN11	CONNECTOR-HEADER	BOX,3P,1R,2.5mm,STRAIGHT,SN	1
CN41	CONNECTOR-HEADER	BOX,4P,1R,2.5mm,STRAIGHT,SN	1
CN61	CONNECTOR-HEADER	BOX,5P,1R,2.5mm,STRAIGHT,SN	1
CN60	CONNECTOR-HEADER	BOX,6P,1R,2.5mm,STRAIGHT,SN	1
CN71	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,BL	1
CN74	CONNECTOR-HEADER	1WALL,2P,1R,7.92mm,STRAIGHT,SN,YE	1
GT-2	CONNECTOR-TERMINAL	PIN,MALE,#18-22,2.35mm	1
DIS1	LED DISPLAY-7SEG	ELD-306GWA,-,2,14,-,15x15.5x7.2,G	1
DIS2	LED DISPLAY-7SEG	ELD-306GWA,-,2,14,-,15x15.5x7.2,G	1
IC04	IC MICOM	MB89538AP-101,MB89538AP-101,64P,+5V,10MHz	1
SW1	SWITCH-DIGITAL	PT65 103,ROTARY DIP,-,DC24V MAX,0.4	1
DS71	POSISTOR	DSA-332MA,2pF MAX,100MOhm,ASM-3	1
RJ01	R-CARBON	0ohm,5%,1/4W,AA,TP,2.4x6.4mm	1
RJ02	R-CARBON	8.2Kohm,5%,1/4W,AA,TP,2.4x6.4mm	1
RJ03	R-CARBON	18Kohm,5%,1/4W,AA,TP,2.4x6.4mm	1
RJ04	R-CARBON	33Kohm,5%,1/4W,AA,TP,2.4x6.4mm	1

12. Wiring Diagram

12-1 Indoor Unit



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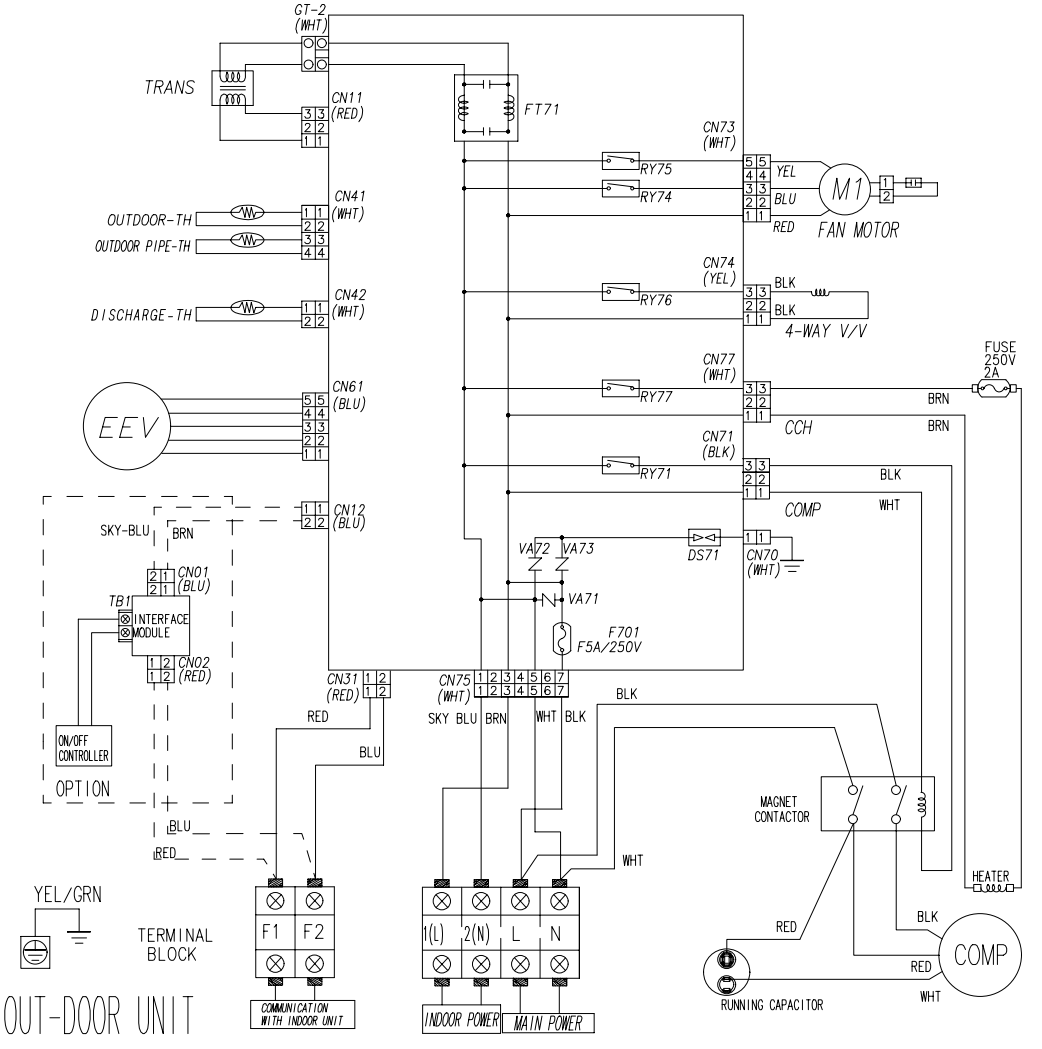

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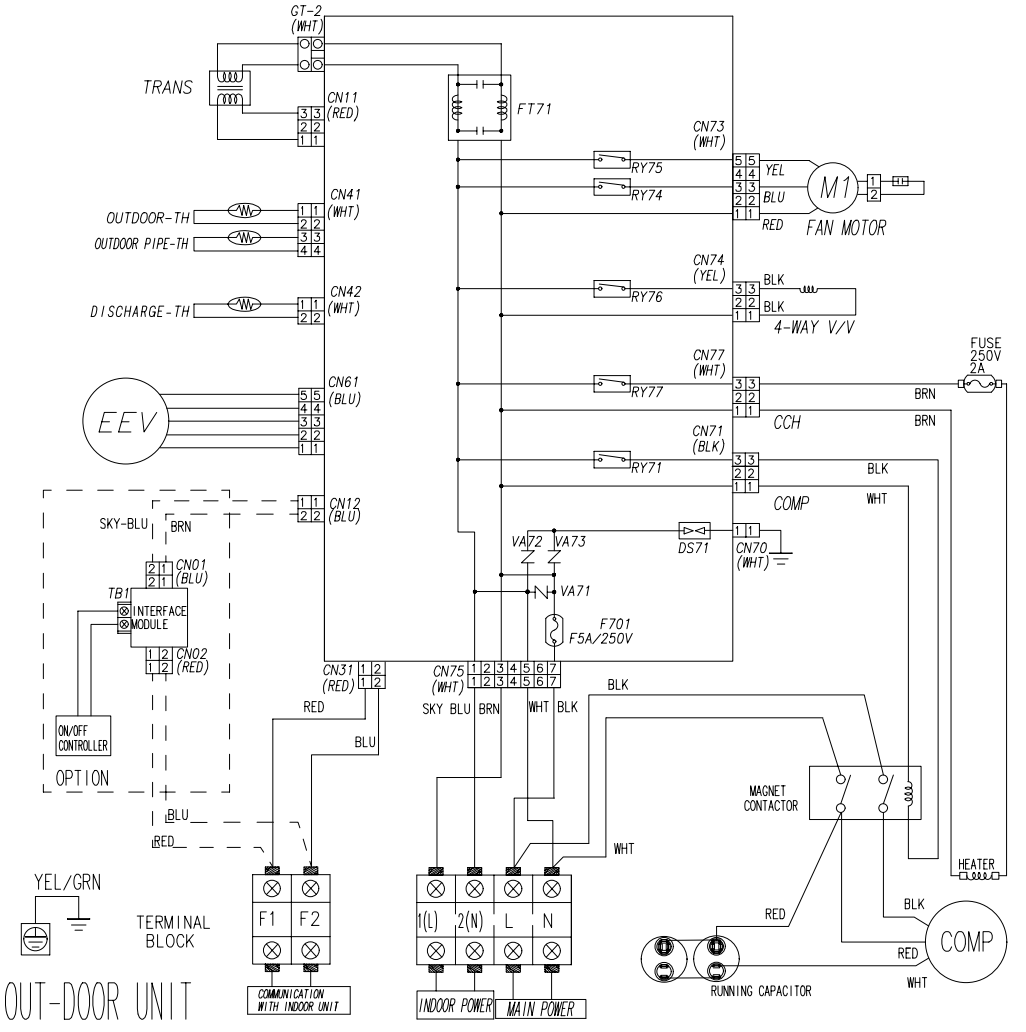

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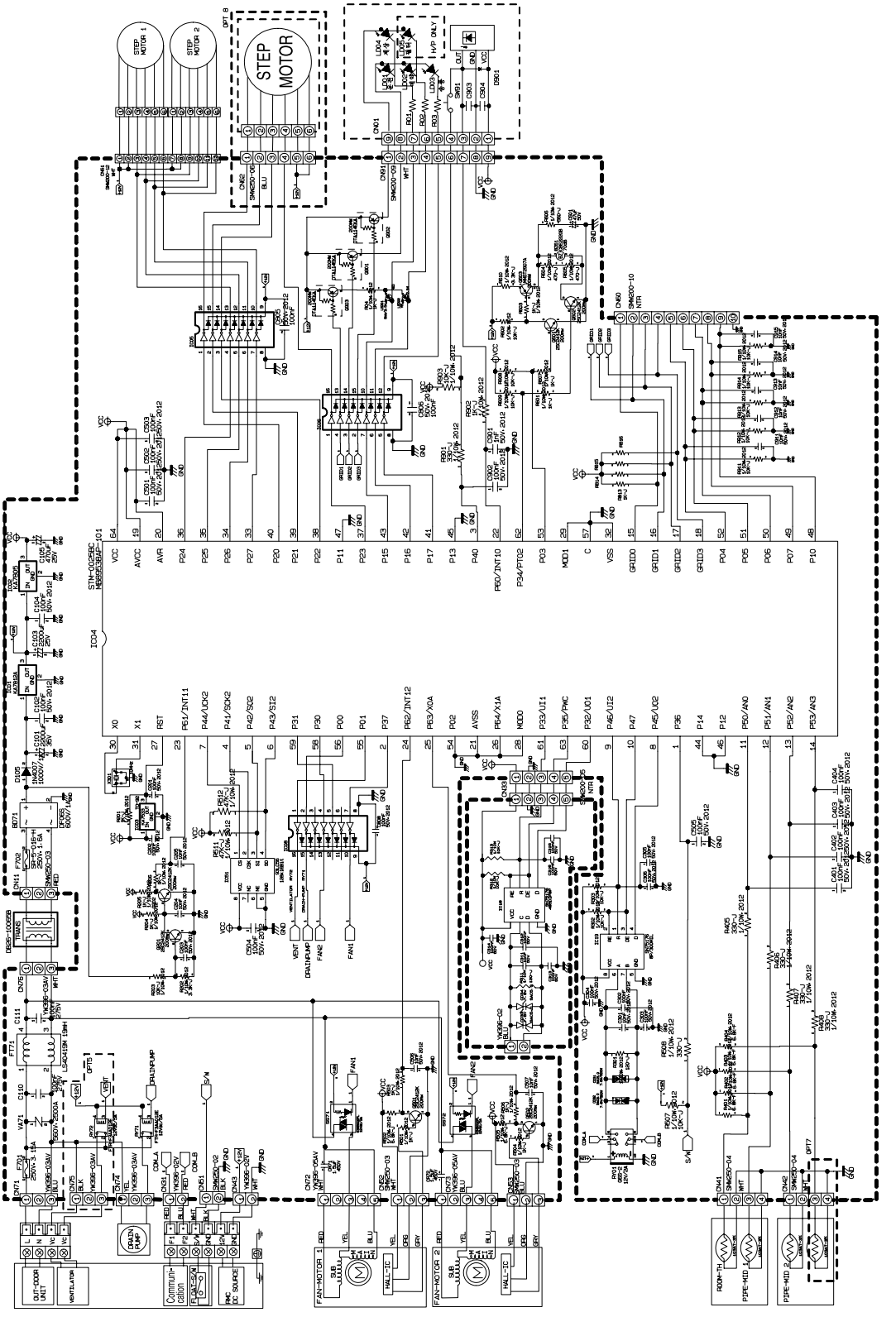
13. Schematic Diagram

13-1 Indoor Unit



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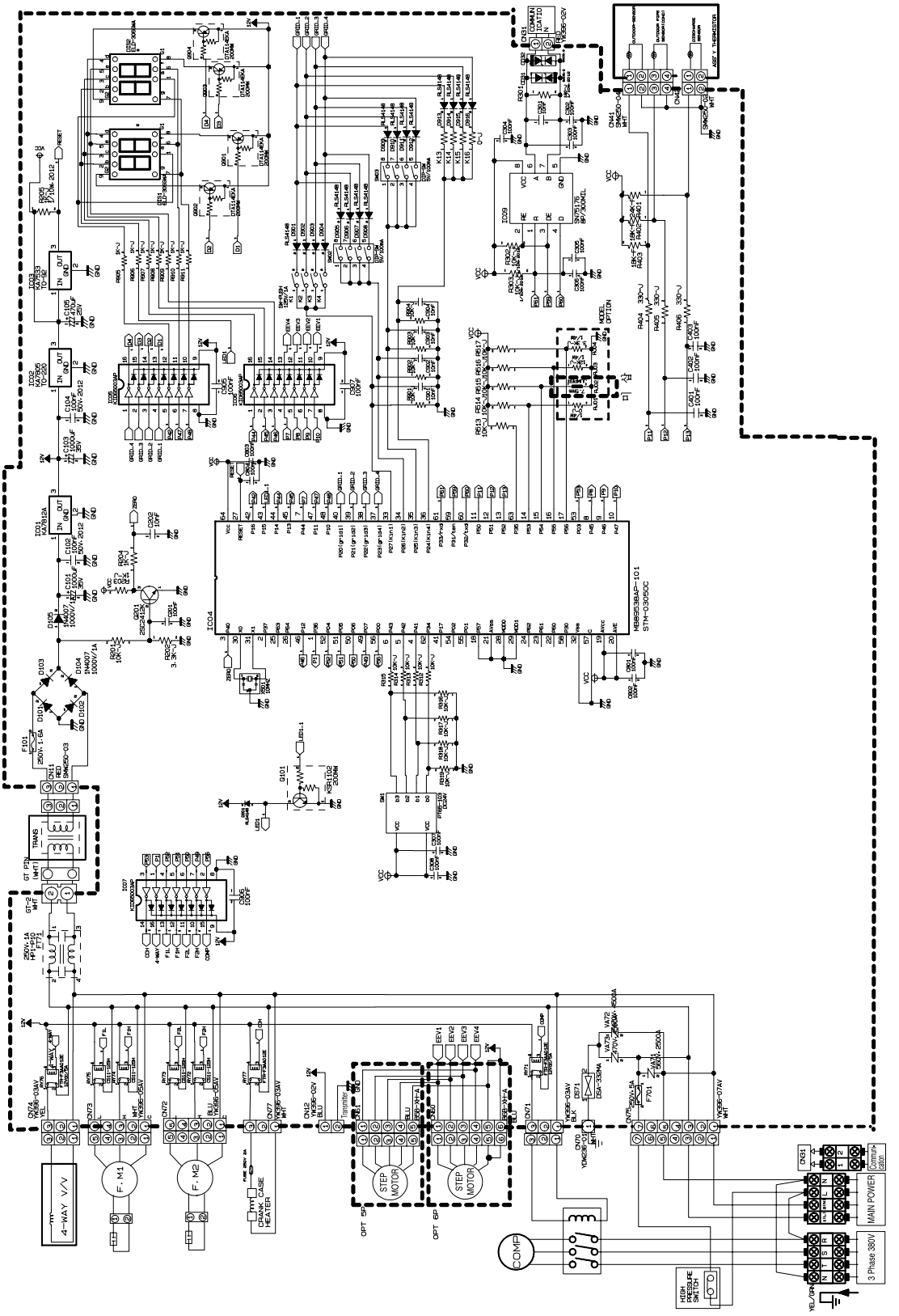

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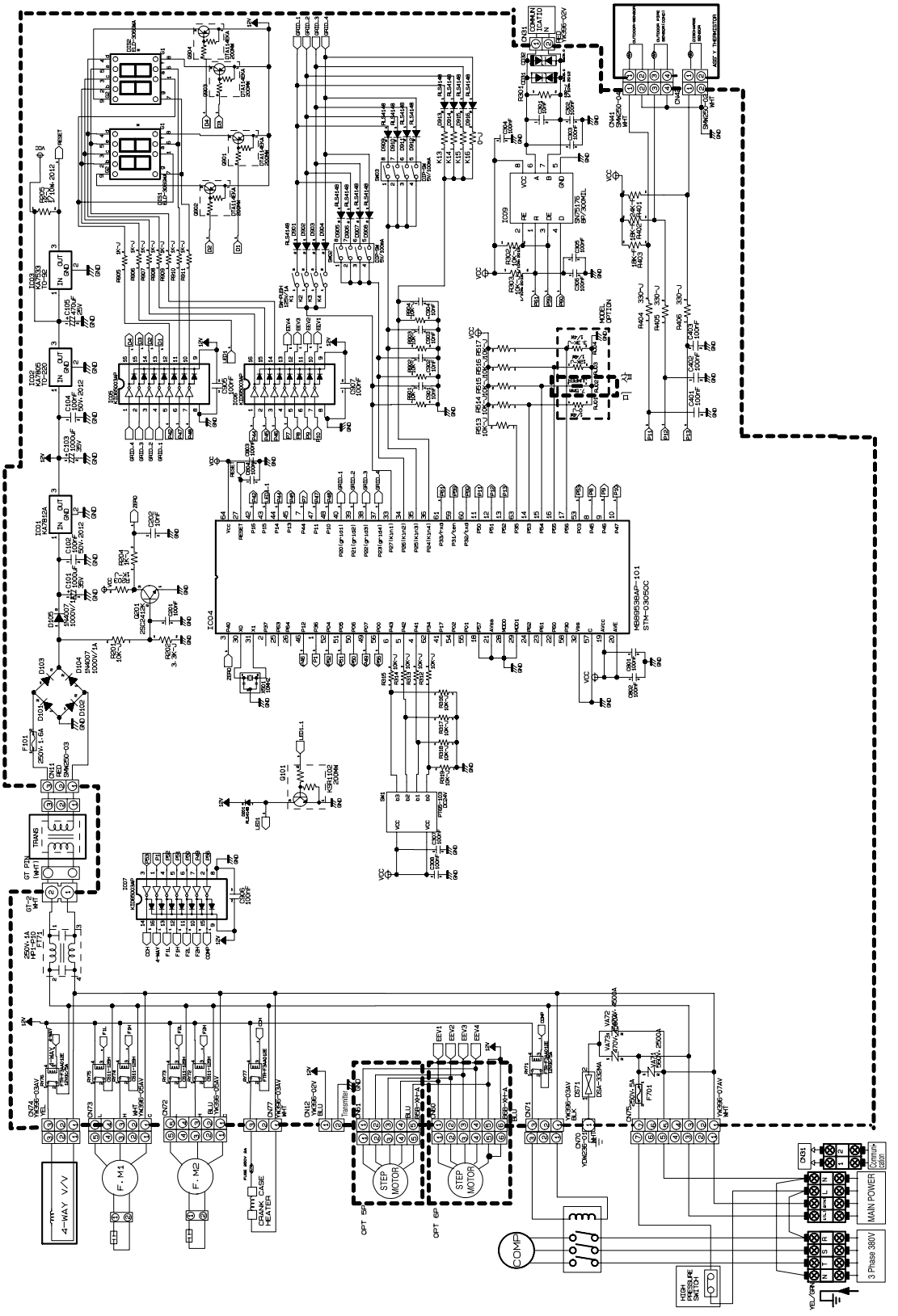

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